

Project conclusion report

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Course: PA2555 Agile and Lean Software Development

Group 14



Summary

This document is a final project report describes the project methodology and development methods during the project which resulted in the “btBox” an online file storage web application. The project is done as a part of course PA2555 Agile and Lean software development during the autumn 2017 carried out by 6 students at Blekinge Tekniska Högskola. The initial purpose of the project is to get in practice with Agile and Lean Development methods and practices. The emphasis of this document is to make reflections on the complete development of the web application.

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1. Project Overview

- I. **Project assignment:** The project is online file storage web application “btBox”. It is a cloud web application where End-users create an account and manage their personal files and documents online. The customers are the end-users how intended to use the product. The main features of the product are creating an account with personal details and login information, login to the user account, upload files to their personal cloud account, creating the download links or share links, view the file usage report and giving the key protection to file or document.

Home Login CreateAccount

btBox
Online File Storage Web Application

File Upload File Sharing File Protection

Create an account

Sign Up Clear

UserName: Vinod Karantothu
Password: ****
Gender: Male Female
Address: Enter the Address
Country: Select Country
City: Select City
Mobile No: Enter the Mobile No
Email id: Enter the Email id
Cloud Space: 25 MB 50 MB 75 MB 100 MB

Fig. 1. web page to create account

Home Login CreateAccount

btBox
Online File Storage Web Application

File Upload File Sharing File Protection

Login

Sign Up Clear

UserName: Vinod Karantothu
Password: ****
Login Clear

Fig. 2. User login page

Home User Details Schema SchemaData Downloads Report Logout

btBox
Online File Storage Web Application

File Upload File Sharing File Protection

Upload a File

Upload Cancel

File Type: Select
File Title: Enter the File Title
Upload File: Choose File No file chosen

Fig. 3. File upload page

Home User Details Schema SchemaData Downloads Report Logout

btBox
Online File Storage Web Application

File Upload File Sharing File Protection

Download Details

ID	UserName	Schema Name	File Name	Time	Usage	Pricing	Delete
23	adhi	DOTNET	constructor in C#.cs	31	23	15	Delete
24	suresh	DOTNET	constructor in C#.cs	24	23	15	Delete
25	demo	PHP	forloopirp.php3	21	12	20	Delete
26	demo	DOTNET	constructor in C#.cs	25	23	15	Delete
27	demo	JAVA	String in java.java	16	41	20	Delete
28	demo	JAVA	String in java.java	24	41	20	Delete
29	suresh	JAVA	String in java.java	26	0.400396	20	Delete
30	suresh	PHP	forloopirp.php3	23	12	20	Delete
31	suresh	PHP	forloopirp.php3	22	12	20	Delete
32	suresh	JAVA	String in java.java	24	0.400396	20	Delete
33	adhi	PHP	forloopirp.php3	94	12	20	Delete

Back

Fig. 4. User file details

The above images are some screen captures of the web application created. Fig.1 is the web page to create an account or to become a user. In the account page the user enters all the required information and create an account by clicking the signup button at the bottom of the form. Fig.2 is login page, here the user enters his credentials to get access to his account and files. Fig.3 is the web page to upload a file. The user enters the file title and upload the file by clicking the Choose File button and the file gets uploaded to cloud by clicking the Upload button. Fig. 4 is the user download page where the user manage all this documents and files and file usage details are shown in this page.

- II. **Team:** The followed development method is agile methodology with scrum framework. Our scrum team consists of six members. Considering the scrum framework, team had the roles of Product Owner, Scrum master and the development team.

Initial Scrum team and respective roles	
Varun Dheeraj	Product Owner
Nitesh Varma	Scrum Master
Vinod Karantothu	Member in development team
Harihara Reddy	Member in development team
Mounica Mathangi	Member in development team
Saisharmila Rednam	Member in development team

Scrum roles:

Product Owner: Varun Dheeraj, one of the student of 6 students lead the product owner role and he is the product owner for this project and acted as the representative for the customer.

Scrum Master: Almost everyone in the team wanted to try being a scrum master. So, 3 students taken this role for each sprint, one at each sprint.

Development Team: There are no predefined roles in the development team we took on. Each member in the team took the task of development and assigned the user stories that he expertise in and build the features. To ensure that the team member really understood the task was reviewed by another team member.

- III. **Selected development model:** The selected development method is agile methodology. Scrum is an agile software development method where the product is developed incrementally, best suited for the projects with fast changing requirements. Lean software development approach is adopted in order to create value for the customer and eliminate the waste. These two methods are widely accepted and adopted to make the product more productive in terms of quality, cost and performance.

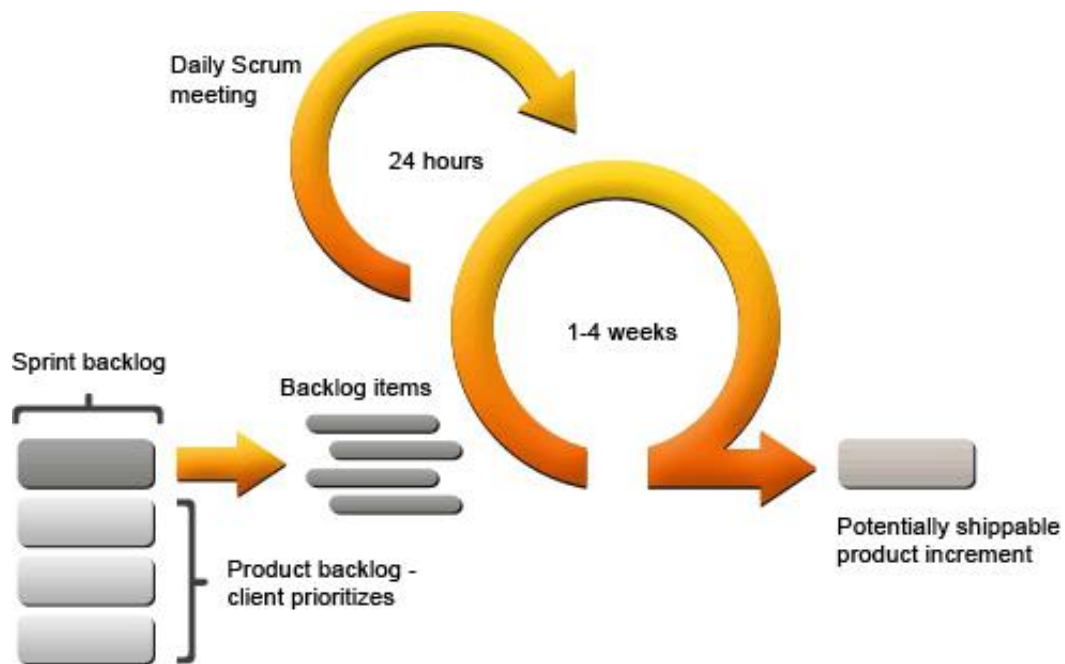


Fig. 5. Scrum Diagram

IV. Budget, lead-time and major events: No budget was planned and estimated as this project is a part of the study course. The resources available are the team members as human resources and they had their own personal computers (laptops) to develop the software. The project was initiated in the 2nd week of September and ended 2nd week of October. The project is carried for four weeks included with 3 sprint releases.

Important dates	
Project Planning (Product backlog, sprint planning)	08 September – 10 September
Sprint 1	10 September – 15 September
Sprint 2	16 September – 29 September
Sprint 3	30 September – 12 October
Final Delivery and acceptance	12 October 2017

V. Procedures and routines: Any software project managing without version control is very difficult. We were planned and trained to use GIT for version control and releases, later we went with visual studio team services repository to handle this task. VST (visual studio team services) also provide tools to run agile team with built-in scrum board and planning tool to run the team effective stand-ups, meetings and retrospective.

2. Project follow-up

In this section the project follow-up data details are presented with burn-down charts and interpretation is made with subject to the data in figures.

Budget follow-up:

	Sprint 1	Sprint 2	Sprint 3
Estimate	43	83	84
Actual	41	83	82
Diff from estimate	2	0	2
Diff as % of estimate	95.35	100	97.62
Goal % diff	90	90	90

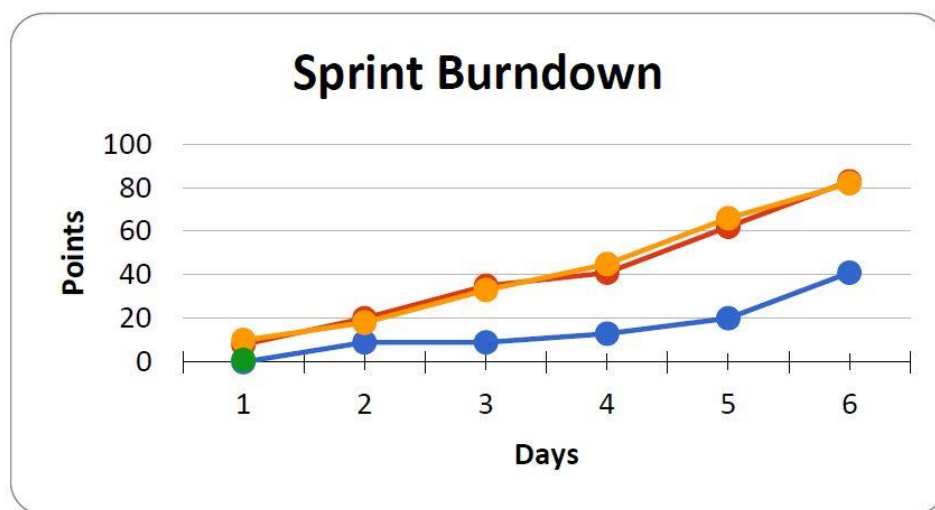


Fig. 6 Sprints Summary Burn-down Chart

Considering all the aspects the project is planned accordingly. Based on the user stories planned in each sprint an estimation was made with story points. In the above figure it represents the estimations made for each sprint. Estimate value is the estimated story points for a sprint that is carried for whole week. For each sprint is completed the chart is updated with actual story points that implemented. Similarly, for each sprint the estimations are made and the actual effort also calculated. Difference between the estimate and the actual is calculated to better understand the loss and gain of the effort. Goal difference among the sprints is done to understand how the work is being carried.

Each sprint is planned for a week. Therefore 3 sprints release have been taken place. The total number of story points are 210 for the 3 sprints averaging 70 story points for each sprint.

Requirements follow-up: Initial, Promised and Delivered

Sprint 1

Prior to the first sprint the product backlog and sprint planning are done involving whole scrum team. In the first sprint all the front-end interface is planned to developed the work is carried accordingly. All the front-end web pages are developed, they are Create account page, Login page, User home page and

Admin page. First sprint is lasted for one week. The promised user stories are completed and delivered successfully.

Sprint 2

In the second sprint the back-end code is developed for the front-end interfaces that are created in the first sprint. In the sprint the task is very difficult and need more expertise to handle tasks and develop the code. Database is created to store the user details and files supported by MySQL tool. The number of estimated story points are more compared to sprint. They are lot bugs found during this sprint, most of resolved and other are moved to next sprint.

Sprint 3

Starting the 3rd sprint most of the back-end work was completed and remaining tasks are done during this sprint. Most of the bugs are resolved during this sprint. File usage details and reports features in the application are added in this sprint. The sprint is lasted for a week. This is final sprint and integration of the all the components is successfully done.

Final presentation

The final presentation was held on the 12th of October 2017. This was done by two members of our team. This presentation is done before the course teacher all other teams part of the course and they too have presented their projects. The working demo of the project is given in this presentation.

Technical solution

Hardware

Every team member had his/her own personal computer which was mainly used for the development. All computers ran Windows operating systems. This made the teams members support each other with problem solving with technical issues.

Development Environment

All of us preferred using NetBeans IDE for development. This IDE helps to develop a software quickly and easily, it is opensource and free.

Programming

Most of team members are skilled in java programming and web development so we build the product using java servlets. For the back-end storage we MySQL database is used. As I have taken the developer role I had a good knowledge maintaining the database I handled the task of creating the database and connecting to with modules.

Project Management

To manage the project in an effective way we have used Visual Studio Team services to use scrum boards and planning tools to support our teams run effective stand-ups, planning meetings, and retrospectives.

Planning and estimation

Burn down chart is used to keep the track of scum project progress. For each sprint, the burn down chart is generated to have a visual view on the work progress. The burn down chart is updated by the scrum master at the end of each sprint. For a clear view, the vertical axis represents the effort and the horizontal axis represents schedule of the sprint. As the task completes the effort decreases

when all items in the sprint are executed the effort levels lasts to zero that mean further no effort is need and sprint was completed. Burn down chat is the most essential thing for any agile project for the team to have a sight what is happening and what is the progress throughout each sprint.

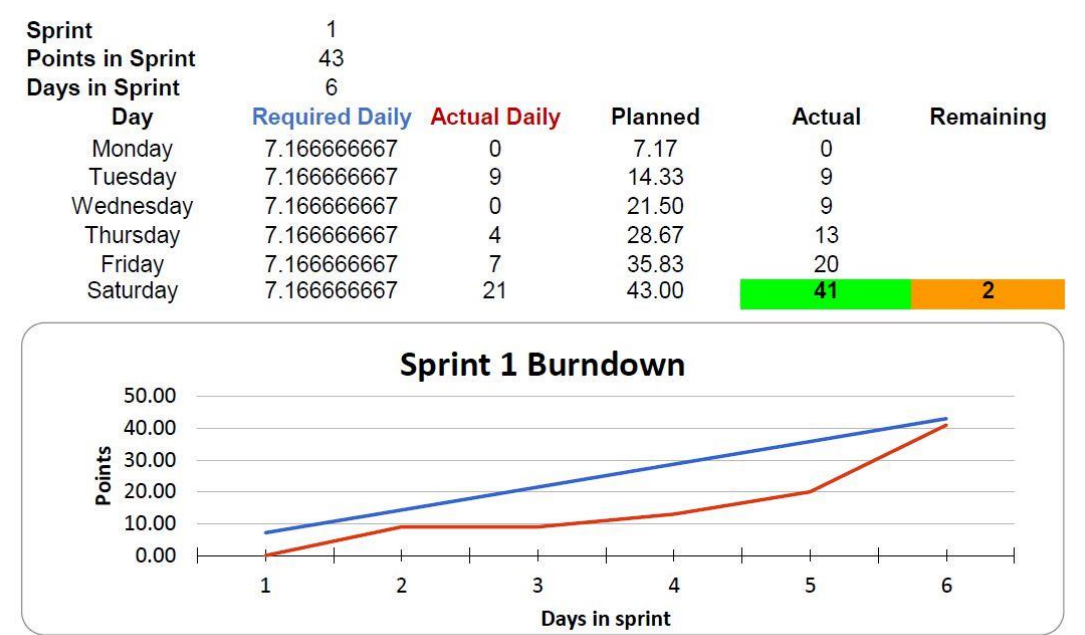


Fig. 7 Sprint 1 Burn-down Chart

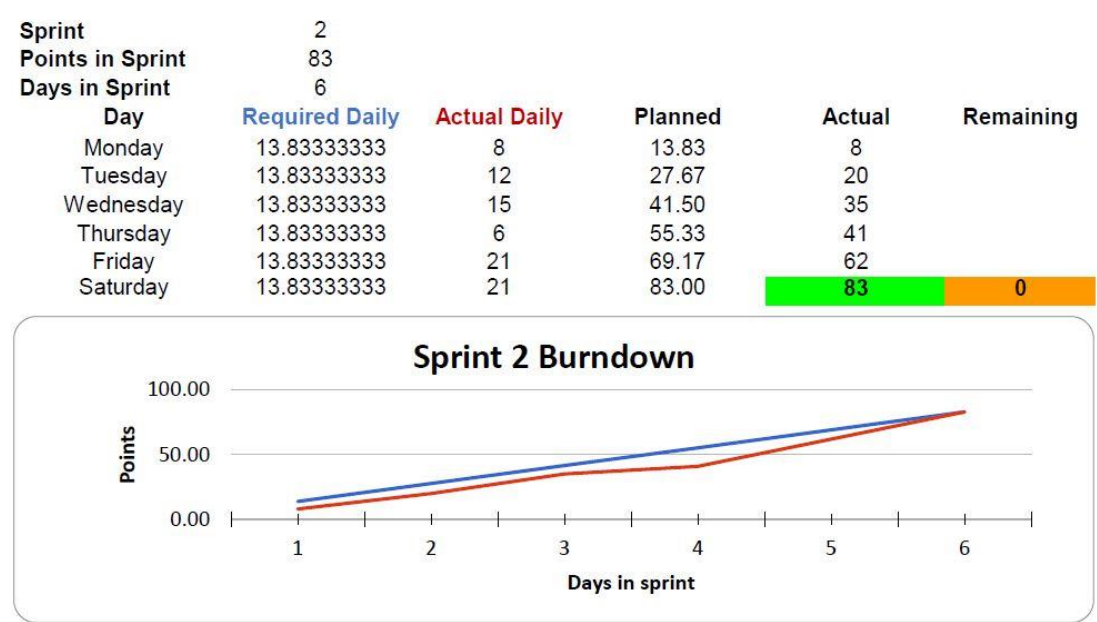


Fig. 8 Sprint 2 Burn-down Chart

Sprint	3				
Points in Sprint	84				
Days in Sprint	6				
Day	Required Daily	Actual Daily	Planned	Actual	Remaining
Monday	14	10	14.00	10	
Tuesday	14	8	28.00	18	
Wednesday	14	15	42.00	33	
Thursday	14	12	56.00	45	
Friday	14	21	70.00	66	
Saturday	14	16	84.00	82	2

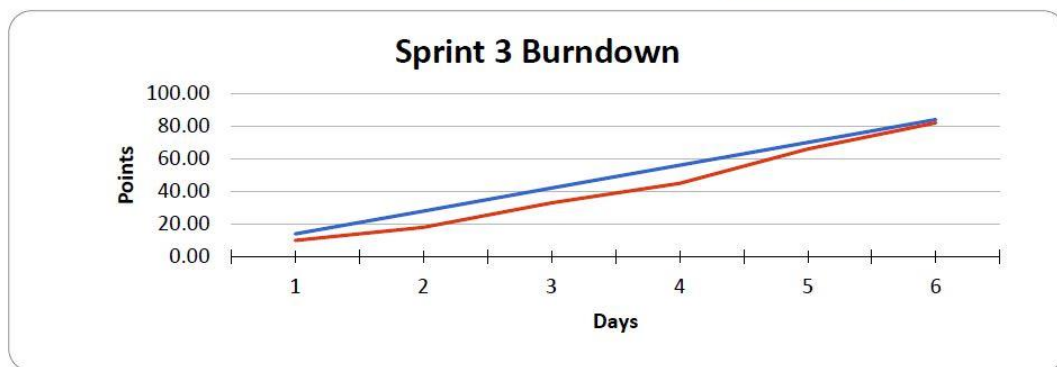


Fig. 9 Sprint 3 Burn-down Chart

Risk management

During the course project we have overcome with different risk factors and are described in this section.

Task division

The most important risk we encounter is task division among the team members with having too little to do. This is how we divided our tasks in initial stage of sprint planning. At the end of each sprint team members with large tasks are went on doing while others remained doing nothing.

Ignoring working Hours

The team members arriving late for daily scrum meeting this is happened mostly every time during the first sprint. so, the meeting is continued even one or two team member arrival was late.

Programming skills

All the team members are not equally skilled and they felt difficult understanding the code. To over this risk we introduced the more comment line in the code so the code is easily understood.

Process, routines, procedures

Daily Scrum Meeting: Daily we conduct the scrum meetings between the development team and the scrum master to discuss previous day work progress and the work done today and impediments occurred in the mean while. By considering each person accomplishment yesterday and will accomplish today in the meeting attains an excellent comprehension of what work is done and the work remains. The meeting is not for a daily update but each team member decides his own commitments to the other team members.

Sprint Planning Meeting: This meeting is held in presence of the product owner, scrum Master and whole scrum team that I mean including the development team. In this meeting, the product owner mentions the high priority items to the development team. The team may discuss on the item and they can make that item to high priority and add more detailed user story to the sprint backlog.

Sprint Review Meeting: After completion of each sprint a sprint review meeting held and development team exhibits their accomplishments and demo the features to increment the product. Assessment is given according to the sprint goal that is set during the sprint planning meeting. Participants in the meeting are typically the product owner, scrum master, development team, end users and developers from the external team or developers of other projects.

Sprint Retrospective: This is done after the sprint review meeting involving scrum master, product owner and entire team. A topic or conflict may rise within the team and discuss continues on whether to start the iterations or stop or continue.

Value Stream Mapping (VSM) result

There are two key metrics related with Value stream mapping. They are Value added and Non- value added. Cycle Time (C/T) and Process Cycle Efficiency(PCE) are calculated based on this two metrics.

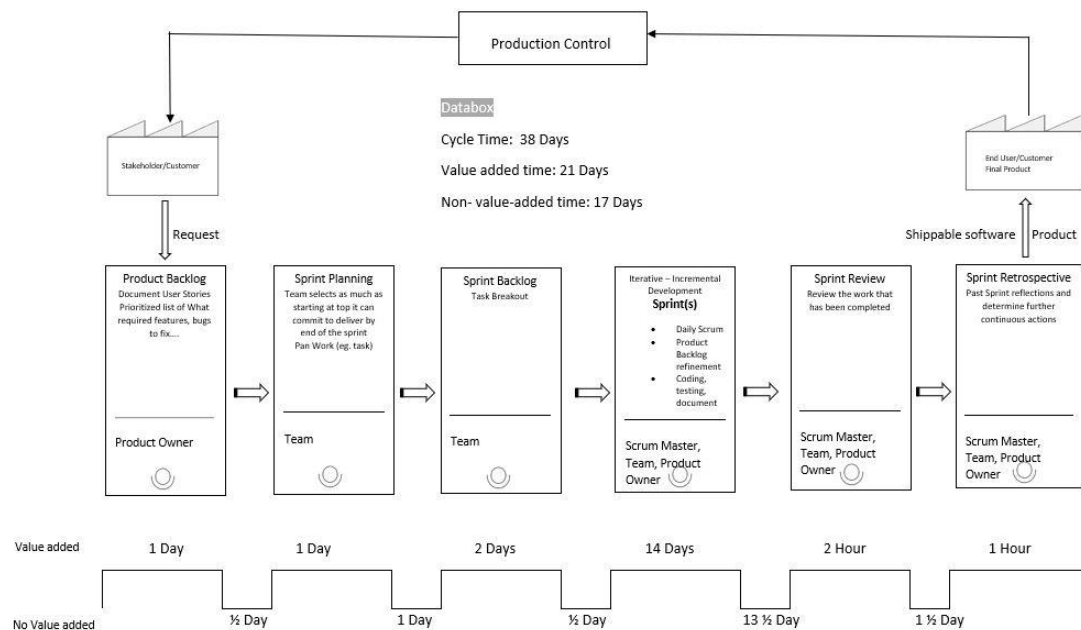


Fig 1. Value Stream Mapping, Software product Development

$$\text{Process Cycle Efficiency} = \frac{\text{Value-Added Time}}{\text{Cycle Time}} = 55.2\%$$

Fig. 10. Value stream mapping (VSM)

If the process include that add value to customer is willing to pay for. In our project the process cycle efficiency is 55.2% that means the customer could pay for the process that add value to customer. Process cycle efficiency is to create the standard how it will be calculated and is improved by decreasing the cycle time through eliminating the non-value-added activities.

Test and product quality

We also build a framework to test the code we created for the project. We started out using JSPunit and JSunit for unit testing for jsp and JavaScript respectively. The product is developed using java servlets where the programming languages Java Sever pages (JSP) and Java. The testing tools selected are best suited for that and are good tools. They have quite simple syntax and produces good reports. Selenium is used for integration and functional testing. The project is very small and can be easily tested so automation is preferred over manual testing.

With our previous course software verification and validation, we had prior knowledge of testing a product and reporting. So, team had not felt much difficult to produce the tests. This helped us to save the time of understanding the testing tools and caught more bugs by using them in a right way.

3. Final reflections and conclusions

Analysis of the product/delivery

The satisfying part of the team is a working product is being developed following the agile methodology. Since it is a web based application to store files

online the most common features integrated in the product. The security risks are not provided in the product. This means the product is not subjected to pen testing where files can be easily retrieved by hacking attacks and need to improve these features. The product is developed according to the customer requirements. What all the requirements raised by customer are fulfilled and delivered to the customer. The value for the customer is created by delivering the product with specified requirements that are useful to the customer and within the estimated duration. As promised to the customer the product is delivered as planned. During each sprint release we delivered the customer a working software. The reasons for accepting the product are a working product with features required by the customer within specified duration of time.

Decision making

Making decisions had a great impact during this product development. Prioritizing user stories and moving them to sprint. Lot decisions are made which user story needs more priority and moved to the top among the team members. And during the sprint some tasks are dependent like before of executing a certain the other need to be executed first. For example, when we creating the back-end code for the user login page the user database is to be created so further decision is to skip the task and user database table is created first. There are more such decision making happened in the entire development process.

Team analysis

The strengths of the team are everyone is with computer science and software background. No extra training or crash course is taken by anyone in the team. Everyone in the team are supported by another while executing the tasks. When some felt difficult in implanting feature in the product the work being exchanged or discussed among the team and made a conclusion how to solve the problem. The team also had very less communication problem and managed with communication tools such phone calls for informal communications, face-to-face meetings. For document sharing email and online drive storage are used eventually.

Main project events and experiences

The main project events are daily scrum meeting, sprint review meeting, sprint retrospective. During the daily scrum meeting the discussion among the team made the development process to move more forward and overcome the impediments occurred during the product development. This is helped us to get a view on the product progress and task to perform next. During the sprint review meeting we discuss among the team whether the requirements that developed useful to the customer and did we make working product in the current sprint. This conclusion drives our team in the right way to develop the right product to the customer.

4. Bibliography

1. L. Rising, N. S. Janoff, and A. G. C. Systems, *"The Scrum Software Development Process for small Teams,"* no. August, 2000.
2. F. Andersson, *"Project Report,"* 2010.

5. Appendix

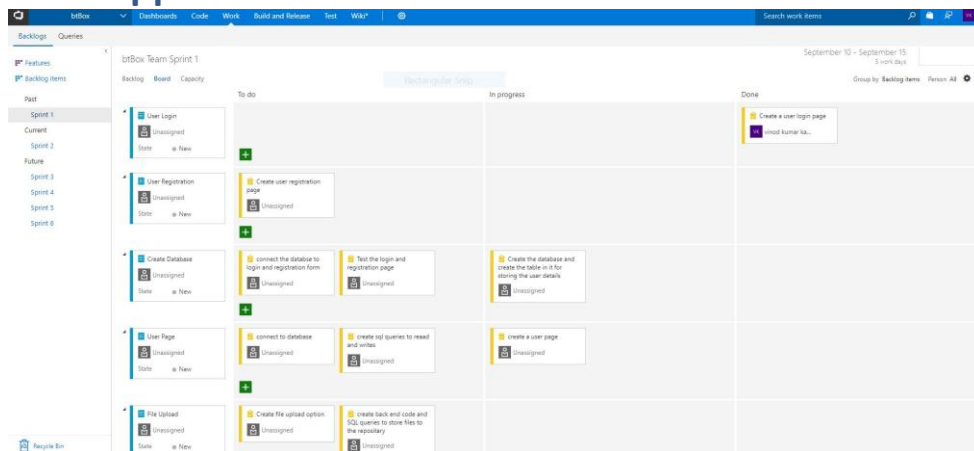


Fig. 11 Scrum task board

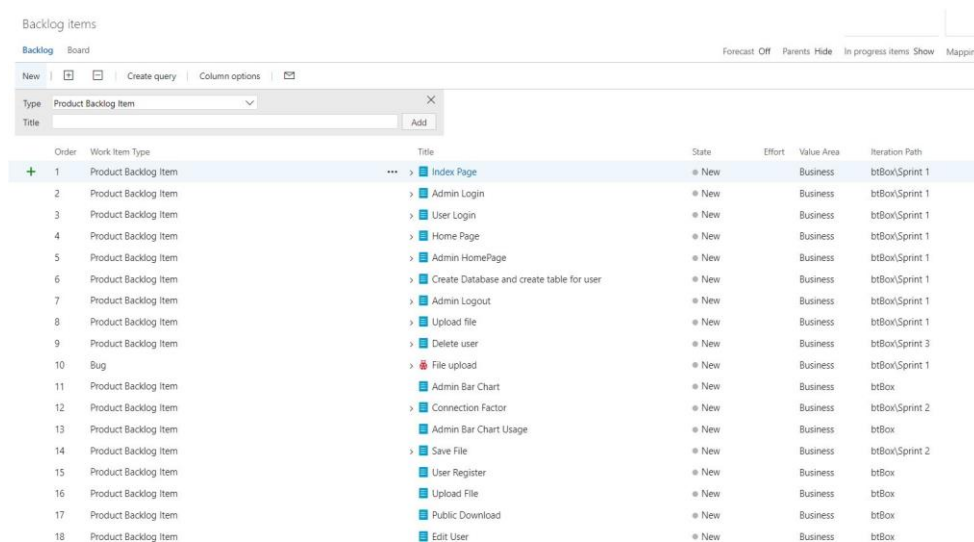


Fig. 12 Product Backlog

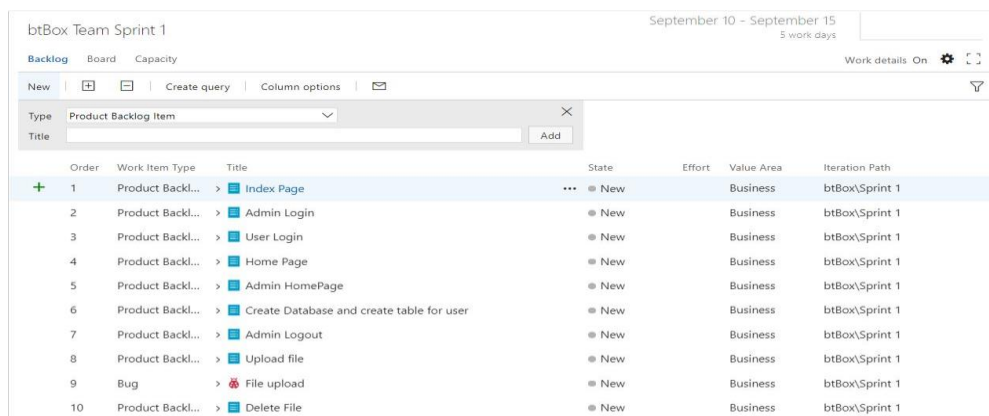


Fig. 13 Sprint 1