



Coin-selection

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Agenda

1. Problem
2. Team
3. Solution
4. Scrum

WHAT?

WHAT ARE WE DOING?

Trying to make a system to predict fees
based on the amount of the transaction,
currency properties and strategy.

WHY?

WHY ARE WE DOING IT?

Because the GNU Taler is not able to give
you a constant fee values



Wallet 1



Deposits coins

Wallet 2



Withdraws coins

Creates purse

Temporary purse



HOW?

HOW?

By making a generation, simulation,
capture it, and after that try to fit Stefan*
curve to it.

*Stefan curve is not common knowledge function name

Technologies

No restrictions.

Challenges



Programming Efficiency



Simulation and Mathematical Modelling



Analytical Post-Simulation Processing



Suggestion generation

Stakeholders



Emmanuel Benoist



Christian Grothoff

Team

Bohdan Potuzhnyi

Roles:

- ▶ Developer
- ▶ System Architect
- ▶ Data Analyst

Vlada Svirsh

Roles:

- ▶ Scrum Master
- ▶ Developer
- ▶ System Architect
- ▶ Data Analyst

Prof. Dr. Emmanuel Benoist

Roles:

- ▶ Product Owner
- ▶ Dozent
- ▶ Mentor

Solution

Steps

01

Simulation of
user transactions
behavioral

02

Application of the
coin-selection
strategies

03

Analysis and
curve fitting

Simulation of user transactions behavioral

- 8 User Types implemented



Student Static



Student



Business owner



Freelancer



Retired



Family



Teacher



Artist

Coin-selection strategies

Strategies implemented

1. Maximal Denominations
2. Minimal Denominations
3. Closest to expire minimal denominations
4. Closest to expire maximal denominations
5. Maximal denominations and time to expire weighted
6. Random
7. Selecting coins of all values evenly starting from smallest
8. Selecting coins of all values evenly starting from biggest
9. Greedy approach
10. *Knapsack is still NP-Complete unfortunately :(*

Application of the coin-selection strategies

- ▶ 3 years of wallet usage for each user
- ▶ Possibility to define number of users
- ▶ Scalable approach
- ▶ Support of different currencies and fees through GNU Taler key's structure

60 000

Transaction for each generated user on average

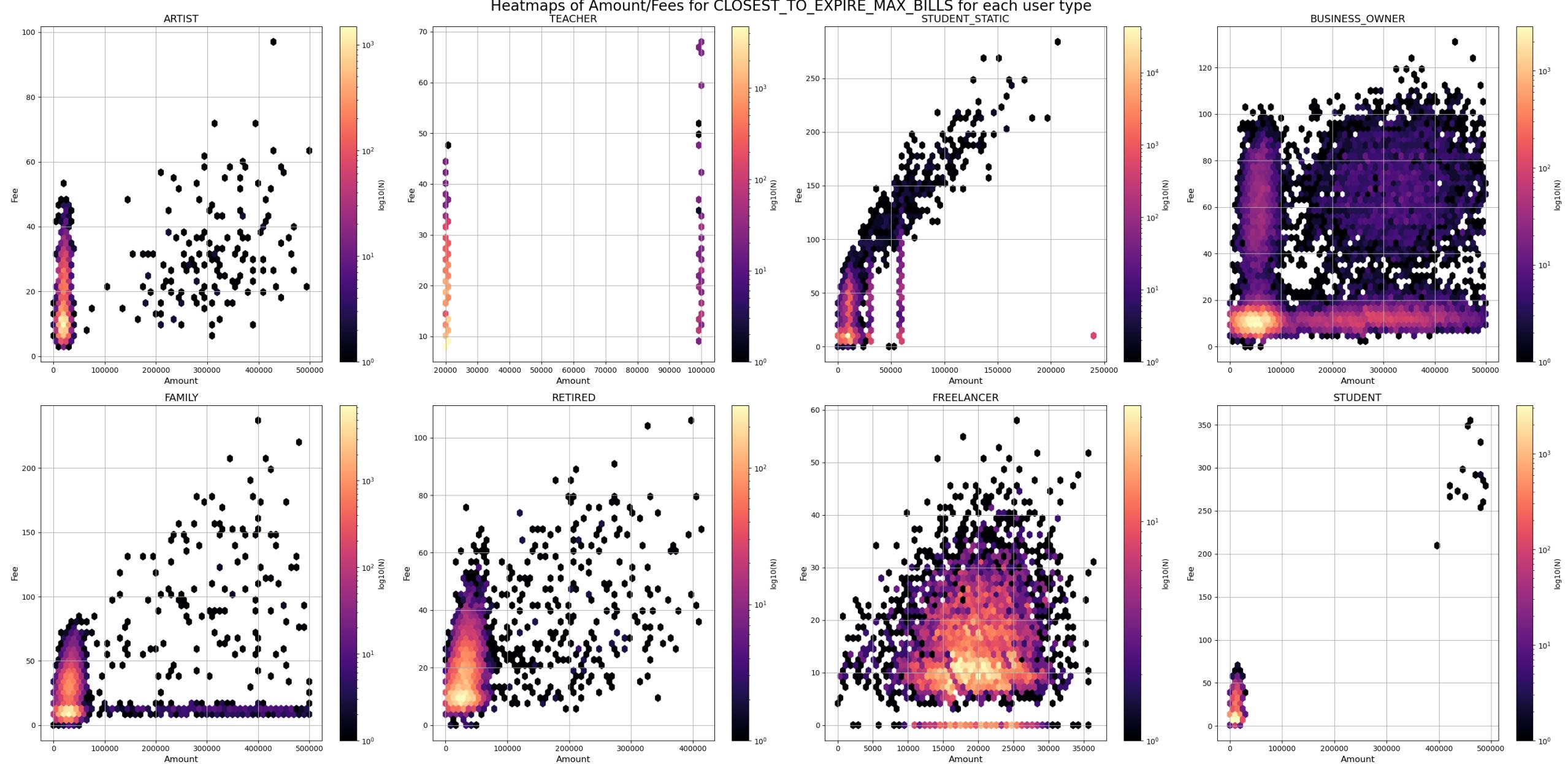
Results

Transaction simulation for user RETIRED with strategy MAX BILLS

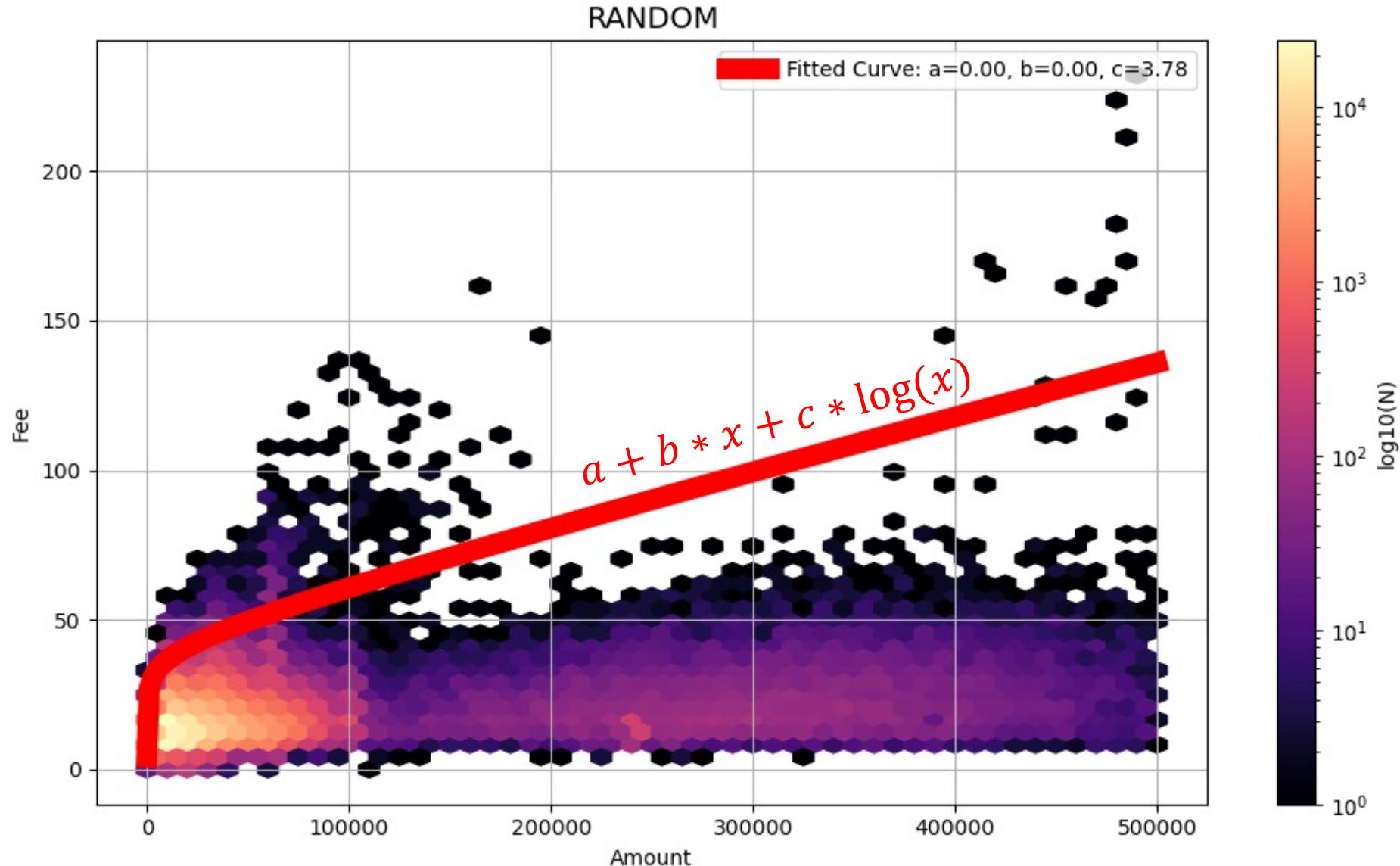
Output of the simulation in files has next information:

TRANSACTION	TIMESTAMP (s)	AMOUNT (mBTC)	OPERATION TYPE	FEE (mBTC)
0	0	881232	WITHDRAW	11
1	0	37285	DEPOSIT	1
1	0	37285	REFRESH	12
2	86400	12740	DEPOSIT	1
2	86400	12740	REFRESH	11
3	172800	43203	DEPOSIT	1
3	172800	43203	REFRESH	12

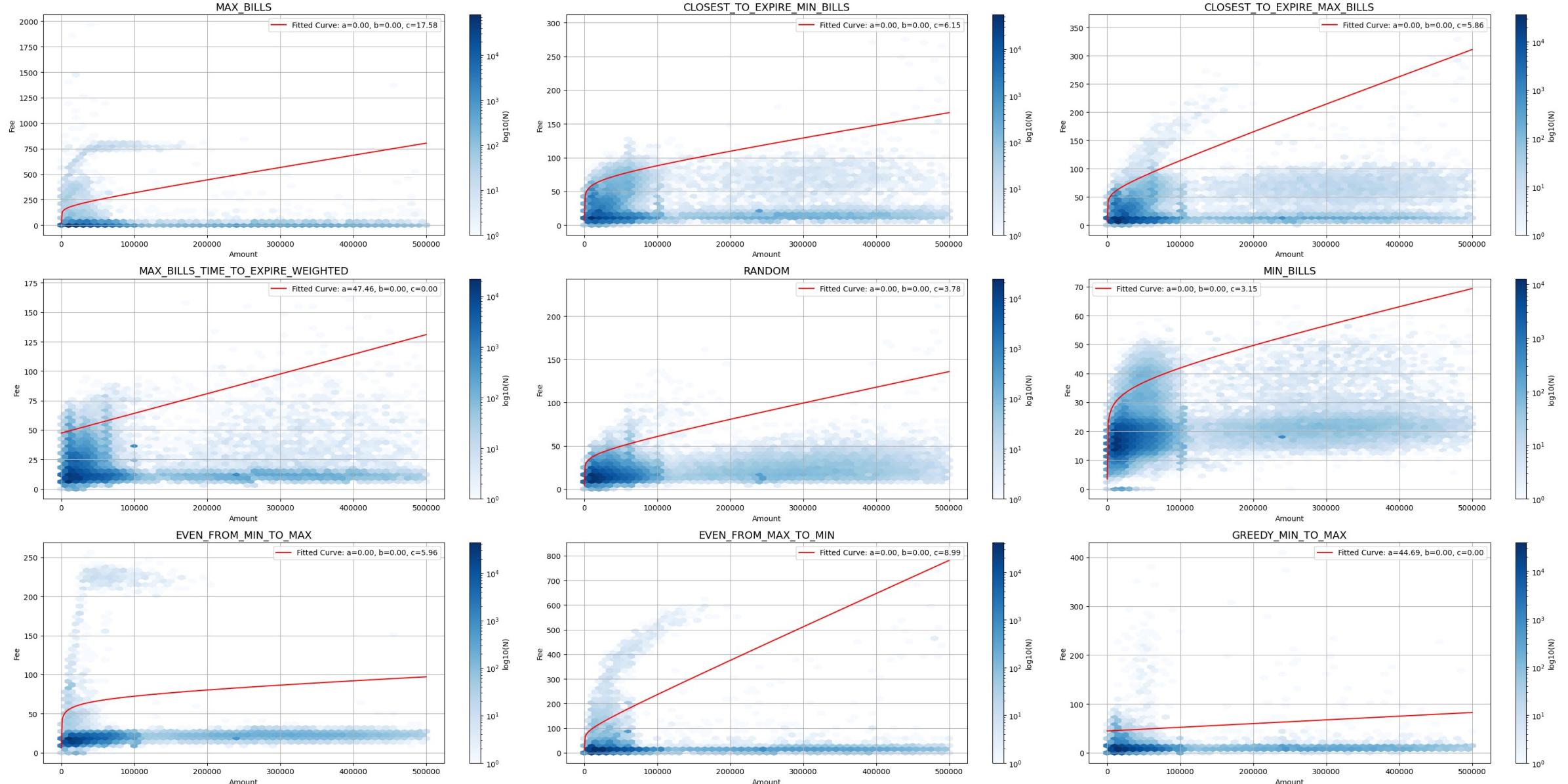
Strategies Analytics



Strategies Analytics



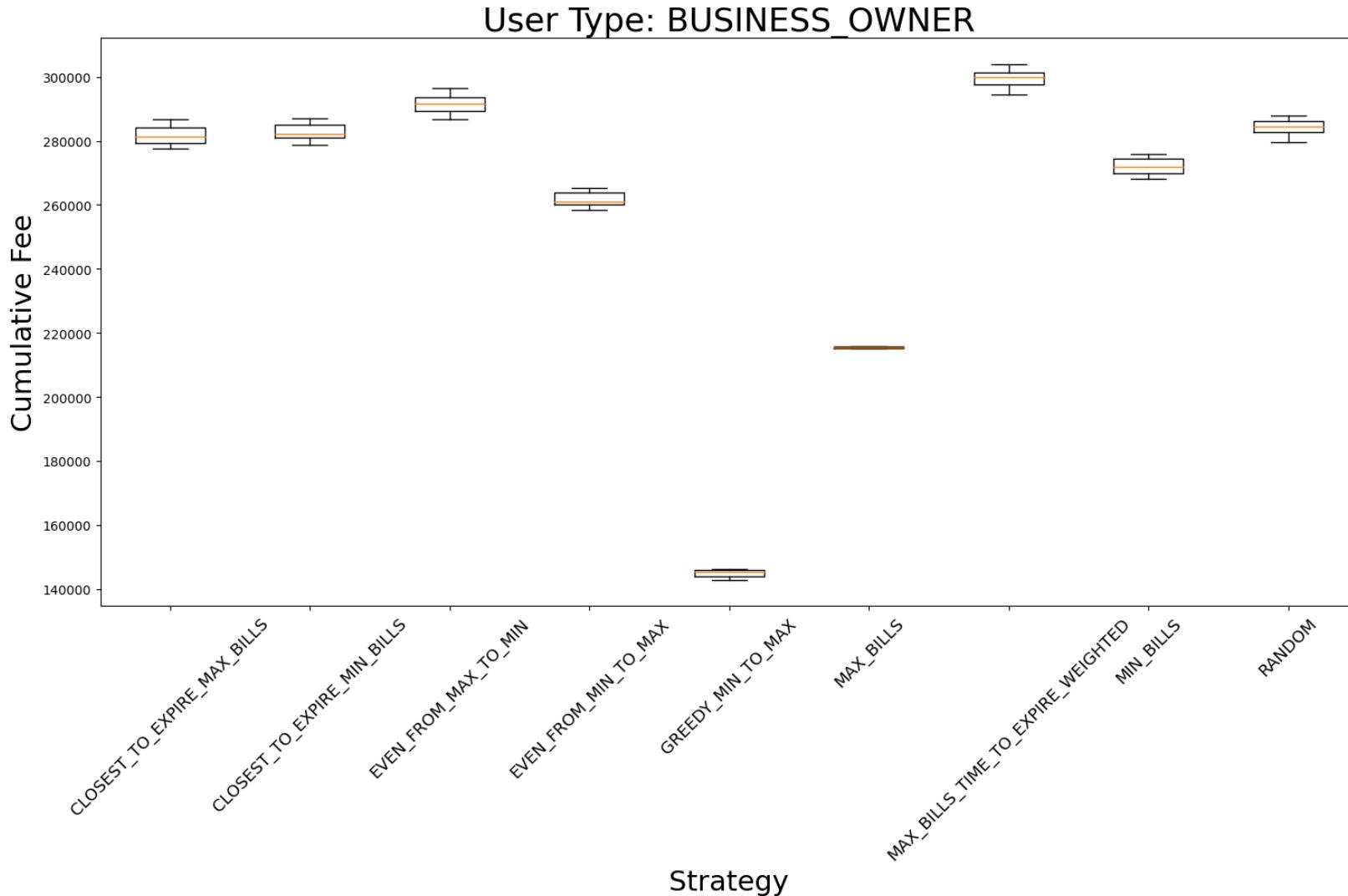
Strategies Analytics



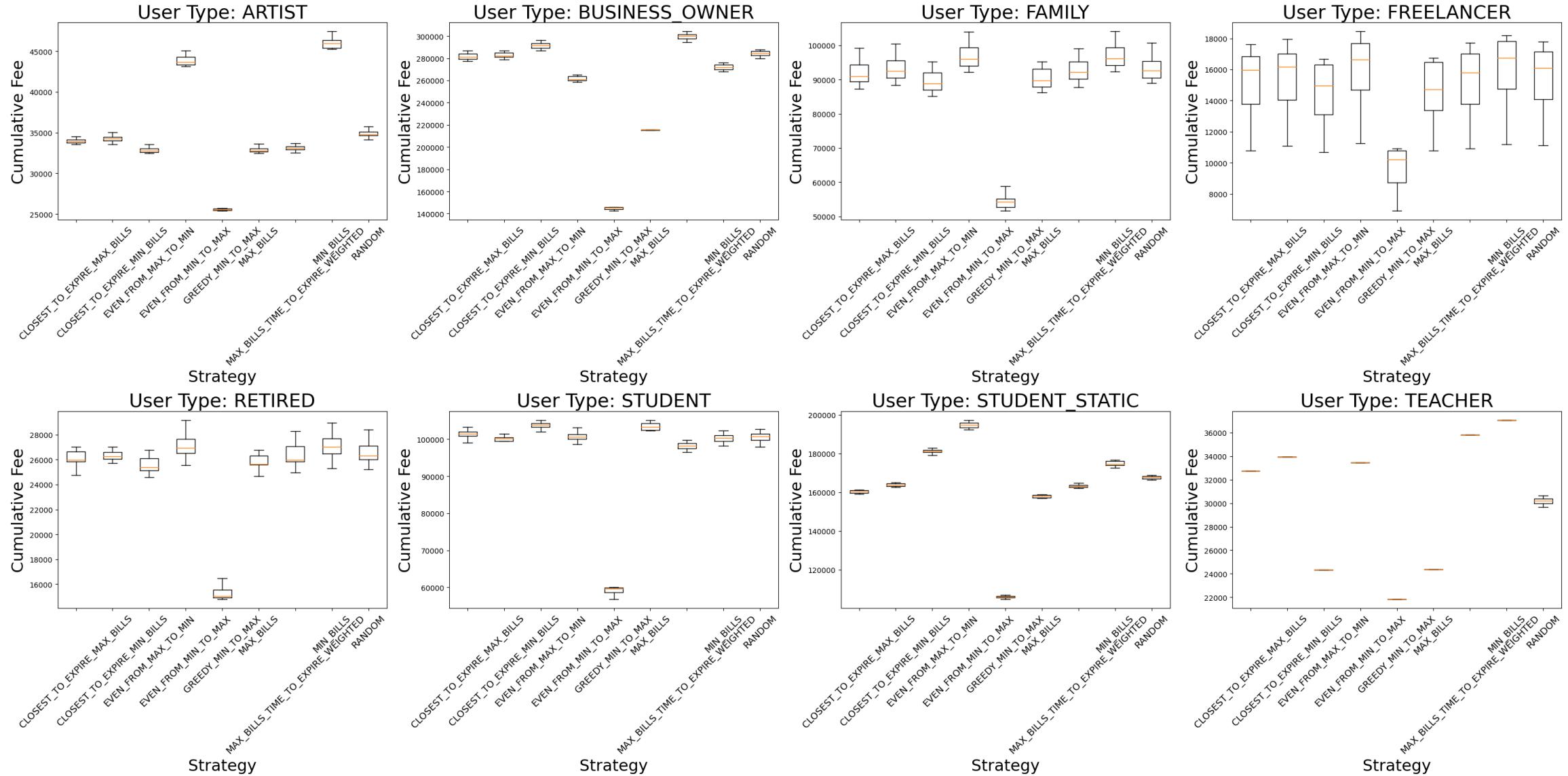
Strategies Analytics

	MAX BILLS	CLOSEST TO EXPIRE MIN BILLS	CLOSEST TO EXPIRE MAX BILLS	MAX_BIL LS TIME TO EXPIRE WEIGHTED	RANDOM	MIN BILLS	EVEN FROM MIN TO MAX	EVEN FROM MAX TO MIN	GREEDY MIN TO MAX
Points Above	1249 0.51%	1551 0.64%	1030 0.42%	1633 0.67%	1063 0.44%	2560 1.05%	813 0.33%	1193 0.49%	924 0.38%
Points Below	241560 99.49%	241258 99.36%	241779 99.58%	241176 99.33%	241746 99.56%	240249 98.95%	241996 99.67%	241616 99.51%	241885 99.62%
Total Points		242809							

Strategies Analytics



Strategies Analytics



Scrum

10 Sprints

Sprint 7: Issue Resolution and Presentation Prep

Apr 17, 2024–May 1, 2024

Closed

project1-coin-selection-gnu-taler / coin-selection-c


9 Issues

100% complete

Sprint 8: Few updates for the project

May 1, 2024–May 29, 2024

Closed

project1-coin-selection-gnu-taler / coin-selection-c


11 Issues

100% complete

Sprint 9: Final presentation and documentation

May 29, 2024–Jun 11, 2024

Open

project1-coin-selection-gnu-taler / coin-selection-c


4 Issues

50% complete

Sprint 10: Final adjustments

Jun 12, 2024–Jun 14, 2024

Upcoming

project1-coin-selection-gnu-taler / coin-selection-c


0 Issues

0% complete

Scrum

Used (liked) tools



GitLab

Scrum

Used (liked) tools



In-person meetings

Scrum

Used (liked) tools



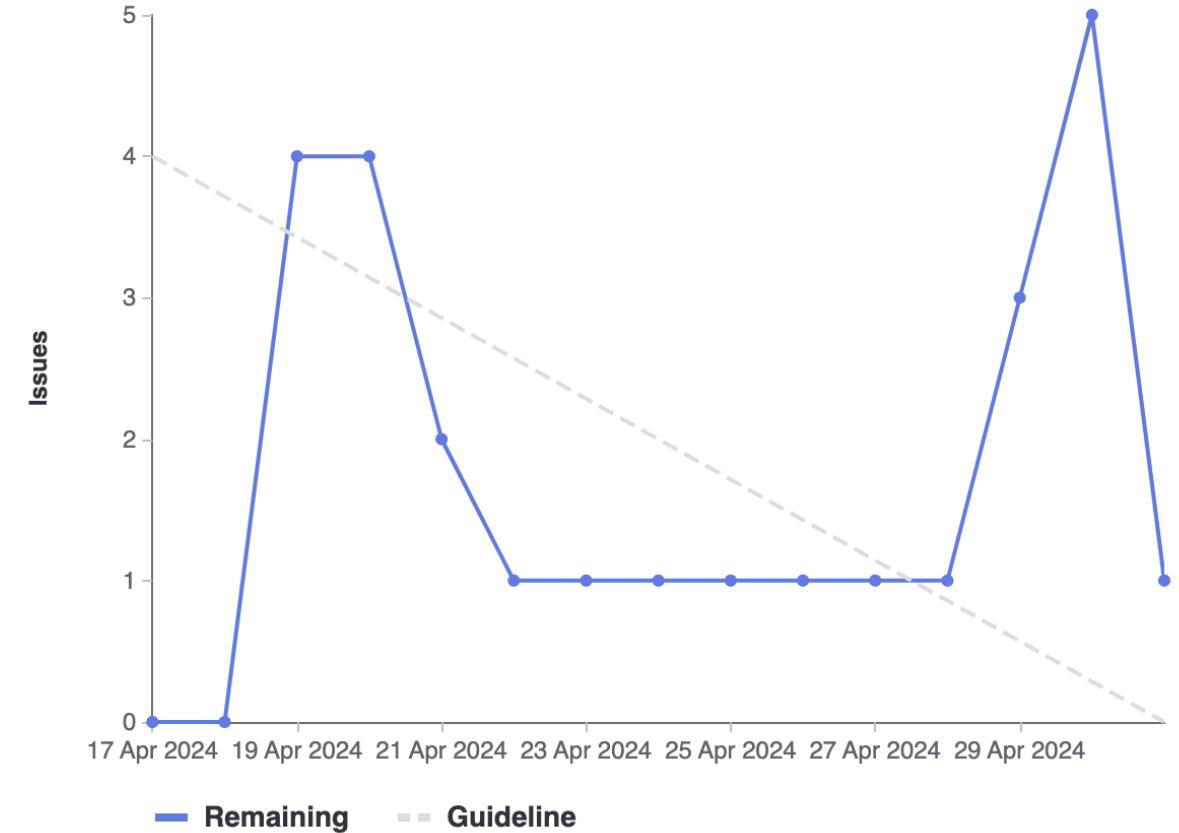
Midterm presentation

Scrum

Not liked tools

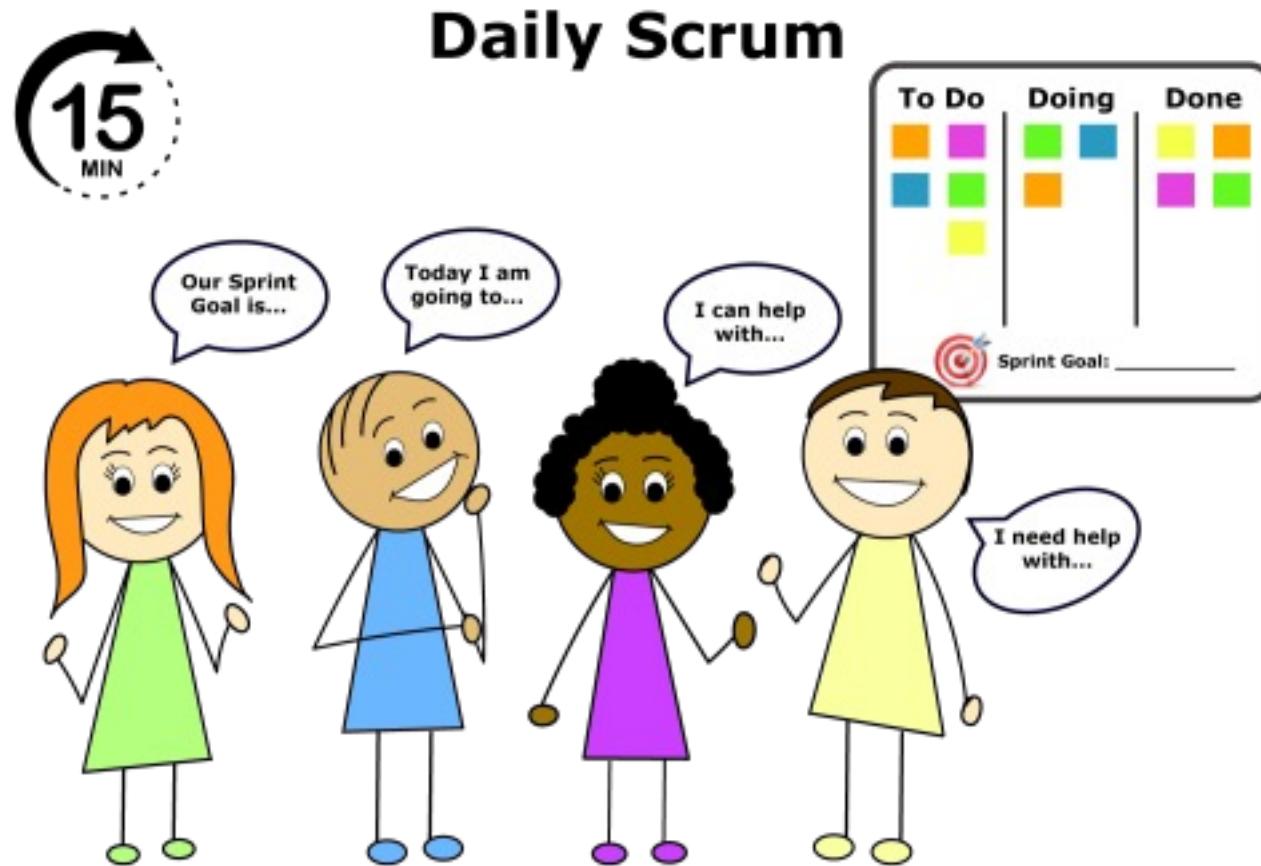


Burndown chart



Scrum

Not used tools



Questions?

Thank you!