Calculating the Gross Function Point:

Inputs:

* Login
* Search message
* Message
* Search contact
* Add contacts to group chat
* Add Files
* Drawing
* payment

User outputs:

* Message
* files/drawings
* Group chat
* User dashboard

User queries:

* Send messages
* Delete message
* Edit message
* Add contact to conversation
* Delete contact
* create chat
* Add people to chat
* Delete chat

Data files and relational tables:

* Users
* Groups
* Messages
* Media
* Businesses/universities
* Payment

External Interfaces:

* App
* API
* Hardware interfaces

|  | Function Category | Count | Simple | Average | Complex | Count × Complexity |
| --- | --- | --- | --- | --- | --- | --- |
| 1 | Number of user input | 8 | 3 | 4 | 6 | 24 |
| 2 | Number of user output | 4 | 4 | 5 | 7 | 16 |
| 3 | Number of user queries | 30 | 3 | 4 | 6 | 90 |
| 4 | Number of data files and relational tables | 6 | 7 | 10 | 15 | 42 |
| 5 | Number of external interfaces | 3 | 5 | 7 | 10 | 15 |

GFP = 24 + 16 + 90 + 42 + 15 = 187

Processing complexities:

(1) Does the system require reliable backup and recovery? - 4

(2) Are data communications required? - 5

(3) Are there distributed processing functions? - 3

(4) Is performance critical? - 4

(5) Will the system run in an existing, heavily utilized operational environment? - 2

(6) Does the system require online data entry? - 5

(7) Does the online data entry require the input transaction to be built over multiple screens or operations? - 1

(8) Are the master files updated online? - 4

(9) Are the inputs, outputs, files, or inquiries complex? - 2

(10) Is the internal processing complex? - 2

(11) Is the code designed to be reusable? - 3

(12) Are conversion and installation included in the design? - 0

(13) Is the system designed for multiple installations in different organizations? - 4

(14) Is the application designed to facilitate change and ease of use by the user? - 3

Processing complexity adjustment:

PCA = 0.65 + 0.01 (4 + 5 + 3 + 4 + 2 + 5 + 1 + 4 + 2 + 2 + 3 + 0 + 4 + 3) = 1.07

Function Point:

FP = GFP × PCA = 187 × 1.07 = 200.09

Estimated effort (E) and project duration (D):

Assumed productivity: 18

Assumed team size = 8

E = FP / productivity = 200.09/18 = 11.1161 ≈ 12 person-months

D = E / team size = 12/8 ≈ 2 months

Personnel Cost:

There are 8 team members.

According to [Payscale](https://www.payscale.com/research/US/Job=Software_Developer/Salary), the average annual salary for software developers is around $78,202 for people working for 0-5 years.

Salary per Developer: $78,202

Benefits and Taxes (assuming 30%): $23,460.60 (0.30 × $78,202)

Total Cost per Developer (Annual) = $78,202 + $23,460.60 = $101,662.60

For a team of 8 software developers, the total personnel cost would be:

Total Personnel Cost (Annual) = Number of Developers × Total Cost per Developer

Total Cost = 8 × $101,662.60

Total Cost = $813,300.80

AWS Software is being used for this project, so AWS Skillbuilder will be used for training the developers during and before the project's timeline

AWS Skill Builder Team subscription: $449 per seat/year (minimum 5 users per company)

Training for 8 people = $449 × 8 = $3,592

Total Cost for Developers and Training = $813,300 + $3,592 = $816,892 per year

Lines of Code:

Database management - 14,800 LOC

* Media - 2400 LOC
* Message - 2800 LOC
* Contacts - 1600 LOC
* Groups - 1600 LOC
* Profiles - 2400 LOC
* Payment - 1600 LOC
* Chats - 1600 LOC
* Login - 800 LOC

| Function | Estimated LOC |
| --- | --- |
| Database management (DBM) | 14,800 |
| API | 1280 |
| Application | 4000 |
| Web | 8000 |

LOC = 28,080

Average productivity for systems of this type = 620 LOC/person-month (Given)

Labor rate = $8000 per month (assumed)

Based on the LOC estimate and the historical productivity data:

Cost per line of code = Labor rate / average productivity = $8000 / 620 = $13

Total estimated project cost = Cost per line of code × estimated LOC = $13 × 28,080 = $365,040

Estimated effort = estimated LOC / average productivity = 28,080 / 620 ≈ 45 person-months