# Segway

## Product Details

### Q1: What are you planning to build?

The product we are building will allow people to use the Segway software within Galaxy. We will build the necessary components to integrate Segway into Galaxy so that users are able to easily access Segway and its different functionality within the interface provided by the Galaxy software. After thorough testing and integration we will publish the Segway software to the Galaxy app store so that users around the world may add it to their Galaxy servers easily. Our overall goal is to make Segway easier to use and more accessible by integrating into the public Galaxy network which is an interface to a shared network of medical software. To be specific we will be using the Galaxy API to access the functionality of Segway through the Galaxy UI.
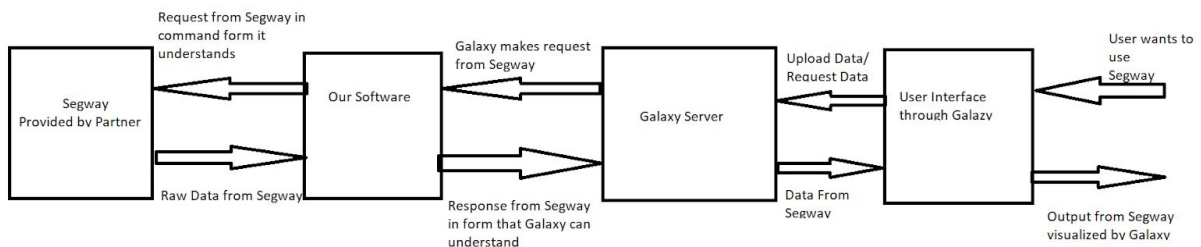


### Q2: Who are your target users?

The main user of our software will be the Galaxy app store, such that Segway will be available to any Galaxy user to add to their server. From there, a wide variety of users will be able to utilize the benefits of the Segway software through our integration product. Some examples of such users are:

A genetic researcher who is not comfortable with the command line tool of Segway.

A graduate student studying biology/genes and who wishes to annotate their data with Segway

A bioinformatician that uses the Galaxy workflow (combining many tools on the Galaxy app store) and would like to integrate the Segway tool as part of it.

Bots that are programmed to use Galaxy to process data.

## Q3: Why would your users choose your product? What are they using today to solve their problem/need?

Several computational tools (e.g. Segway) are offered for genetic researchers to facilitate their research process, while those tools might not always be intuitive to use. Considering the fact that biologists often do not have much experience working with and solving technical issues (e.g. dependency installation/ command line tools). It seems like it might have been troublesome and distressing for these users to spend their time exploring those technical tools in order to get what they really want. On the other hand, Galaxy is a software that allows these researchers to take their data and run it through what they call 'work flows' which is essentially a sequence of different softwares they wish to utilize on their data and Galaxy provides a simple GUI for the results from the tools in the workflow the user has selected.

Any user wishing to integrate Segway into their research will find that our product allows for far easier integration; a simple matter of going to the Galaxy app store and adding it to their work flow to view the results of Segway in the convenient Galaxy GUI as opposed to complicated, potentially intimidating, software which is Segway in its command line form.

The team's final product will allow users to save a tremendous amount of time as they do not have to struggle with the Segway software and its complicated command line tools directly and will also easily be able to integrate it into their other research via the work flows. This aligns with our partners goal of making Segway more widely available and accessible, especially with its publication to the Galaxy app store.

## Q4: How will you build it?

The Galaxy server will be used to establish a "tool" interface for Segway such that users will be able to upload their data and use the different aspects of Segway without needing to install the program and understanding the complicated command line system.

Due to the platform limitations, we will mainly use Python and XML for developing the tool.

We will deploy to the Galaxy app store so that users may download it to their private servers to make use of the Segway software.

We will be working heavily with the Galaxy API as well as the Segway software itself.

We will be testing our software by using Segway on our private servers and verifying the interaction between Galaxy and Segway works as expected, such as sample test scripts provided in Segway, we will recreate these scripts through the GUI of Galaxy and ensure output is correct.

## Q5: What are the user stories that make up the MVP?

As a neuroscientist, I want to run my Segway analysis by just a few clicks on the web page so that I no longer have to worry about making typos while calling segway.

As a genetic researcher, I want to be able to easily upload my data to Segway in order to easily analyze and annotate it.

As a Galaxy user, I want to be able to add Segway to my workflow in order to further my research.

As someone who doesn't understand command line, I want to use Segway in order to gain its insight into the genetic data without reading through a 18 page documentation.

As a doctor with a laptop that does not have so much storage space, I want Segway easily accessible from the Galaxy app store and not have to download the application itself in order to save time.

As a Segway user I want to be able to easily view my results in the Galaxy user interface in order to ease my analysis and sharing of data.

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# Process Details

## Q6: What are the roles & responsibilities on the team?

Describe the different roles on the team and the responsibilities associated with each role.

- Roles should reflect the structure of your team and be appropriate for your project. Not necessarily one role to one team member.

List each team member and:

- A description of their role(s) and responsibilities including the components they'll work on and non-software related work
- 3 technical strengths and weaknesses each (e.g. languages, frameworks, libraries, development methodologies, etc.)

The project is still in its first stages and the team does not have any specific tasks for each member regarding the coding aspects of the project yet. Our current goal is to familiarize ourselves with Segway and Galaxy, which we will be working closely with throughout our whole project. However, we do have members of the team tasked with communication / admin roles, and also members that help fellow members to understand the scope and specifics of the project more. We expect to have changes in roles and responsibilities after the team finalizes the structure and specifics of the project.

Jason :
- Roles: Member
- Responsibilities:
    - Learn and understand the Galaxy and Segway API's as well as XML file format
    - Help develop tools for Galaxy that utilize Segway by creating the necessary XML files, test these tools
- Strengths:
    - Python, API's, and AWS for Galaxy deployment.
- Weaknesses:
    - Unsure of Web Programming (such as JavaScript for Galaxy GUI), XML file creation, Galaxy and Segway understanding

Luke
- Roles: Member
- Responsibilities:
    - Get familiar with Segway's use cases and understand the Galaxy Tool/API/System
    - Develop a Galaxy Tool solution and test it

- Strengths:
    - Rich software development/deployment experience including XML/API, Linux and popular programming languages
- Weaknesses:
    - Poor at writing documents
    - Have limited knowledge of biology and genomes


Victor
- Roles: Member
- Responsibilities:
    - Learn and understand Segway and Galaxy APIs
    - Understanding the Galaxy toolshed and the process required to integrate our 3rd party software with the Galaxy server.
- Strengths:
    - Scripting
    - Familiar with command line tools
    - Python development, APIs, etc
- Weaknesses:
    - Limited knowledge of genomics and biology
    - Web programming
    - XML file format


Patsy

- Roles: Member
- Responsibilities:
    - Email communications with the partner and set up possible meetings
    - Familiarize self with both Segway and Galaxy documentation and functionalities
    - Develop an MVP with the team, that is to integrate Seway as part of Galaxy's tools
- Strengths:
    - Python, Java, C, JavaScript (working on website that uses React)
    - Good at writing and editing documentations
- Weaknesses:
    - Takes more time to understand implementations and structures at a more abstract / metalevel
    - Lack of experience working with similar projects like this
    - Has limited knowledge and understanding of other languages
    - Not so good with writing tests

Ruby:

- Roles: Member
- Responsibilities:
    - Learn and understand the functionality/usage of Segway and organization/workflow of Galaxy API.
    - Depending on how our further coverage of which Segway features to be integrated into the Galaxy tool.
- Strengths:
    - Python, Java development
    - Database (SQL) (if needed)
    - Simple debug
    - Understand things in high-level way
- Weaknesses:
    - Still learning Web development (Html, css, JavaScript)
    - Easy to ignore some detail information

George
- Roles: Member
- Responsibilities:
    - Learning and Understanding how to use Segway and Galaxy, helping to build the application that will allow a user to utilize Segway through Galaxy.
- Strengths:
    - I Have used Python, C and C# for projects and business software.
- Weaknesses:
    - New to web programming and I have limited JavaScript experience, limited understanding of the Galaxy toolshed.

Ruosen
- Roles: Member
- Responsibilities:
    - Reading and understanding the Segway and Galaxy documentations
    - Implementing and testing applications
- Strengths:
    - Python and Java development
    - Knowledge of functional programming
- Weaknesses:
    - Minimum knowledge of web programming and XML
    - Lack of experience in developing large-scale software
    - Limited background in bioinformatics and molecular genetics

**Q7: What operational events will you have as a team?**

We plan on having weekly meetings with our partner at the Princess Margaret Research center in their conference room so that both the team and the partner are kept up to date of the progress and status of the project. Our partner has a better understanding of Segway and would be able to resolve complications and help the team learn more about the software. At these meetings, one of the lead designers of Segway will also meet with us and we would expect to learn more about different aspects of the Segway software. Segway has lots of different functionality and options and each week we hope to be taught a new aspect they wish for us to integrate. At these meetings we will get the information required for us to integrate that functionality into Galaxy.

We have had one meeting with our partner in which general introductions were made and they explained the general concepts of Segway and Galaxy. This includes their expectations and what they lined out to be an MVP they want. One of our partners who we must meet with, a designer for Segway, has been under the weather for the past week and thus has been unable to meet. We planned to meet the first week of February, however due to their illness, we were not able to. We hope to meet with them as soon as possible.

In addition to meeting with our partner, we will be meeting after tutorials and on Fridays (4pm-6pm) to discuss each member's progress on the project and help each other fill in gaps. As in the past weeks, we have met up to resolve confusions about the scope of the project and confusions about each component of the project (ex. Some members were confused about how Galaxy functions, and members with a better understanding of Galaxy were able to explain and resolve the confusion). Other such meetings are held online as we discuss over a group chat / through meeting calls, what we have learned about Segway and Galaxy. Such examples are the sharing of API's and examples online with the group to discuss.

## Q8: What artifacts will you use to self-organize?

We will be using the software trello to keep track of our progress as well as assign tasks and keep track of our work. Tasks are prioritized in the form of who's work needs to be done before others can begin, for example a member cannot begin testing their code until another member has successfully deployed our private Galaxy test server. With Trello we are able to track the progress of such things such as marking things as To-Do, In progress, completed, etc.

Below is a link to our Trello board:
(https://trello.com/invite/b/WUaMPqMt/71ca67f0a3c29a450d5da402641e405d/csc301-project)

## Q9: What are the rules regarding how your team works?

Meetings / Communications:

- Monday:
    - 8pm (during and after tutorial)
    - Bahen Room 1180
    - In-person
- Friday:
    - 4pm - 6pm
    - Bahen Room 2270
    - In-person
- Due to busy and conflicting schedules, we expect to meet in-person at least once a week during tutorial or on Fridays, and then based on both partner and individual availability, we expect to conduct weekly meetings with the partner at the MaRs center. We have been communicating and scheduling meetings with our partner through email.
- When members have specific issues they wish to discuss,  a meeting time can be proposed in the group chat based off of our when2meet, which can be found here: https://www.when2meet.com/?8632710-qijKM=
- We communicate through Facebook messages (in a group chat) on a more regular basis. The team had agreed on the following conducts:
    - Be nice
    - Always react to a comment or suggestion (whether it be an emoji reaction or a comment reaction)
    - Make constructive comments and advices when there is a problem
    - Keep track of deadlines and remind each other of deadlines coming up

Conflict Resolution:

- One big issue that may arise are unresponsive team members. As a group we have decided that when a message is proposed in the group chat, to all either respond to it directly or to "like it" to verify that it has been seen and acknowledged. In the event that a team member has not viewed the chat and cannot be contacted we will email them directly.
- Because we are all learning both Segway and Galaxy, disagreements may arise from misunderstandings of these pieces of software, such as group members not agreeing on what work needs to be done, or how difficult it may be. We propose to solve this solution by having all parties sit down and explain their point of view, and at the same time also consulting the official Segway and Galaxy documentations, to ensure everyone's interpretation lines up. If the disagreement cannot be resolved after taking these measures, we will consult either our partner or the TA.

- Disagreements in priority may arise, for example one member may feel we should spend our time building tools for Segway, while another thinks we should spend our time deploying our own Galaxy server. In cases like this both parties will have fair points however it will be up to the partner to decide what they prioritize. For example do they want the tools made and not be concerned about actually using them, or do they want us to firstly deploy a server so they can use the base functionality before we add anything to it. Either way in cases like these we will consult with the partner or the TA, who are far more experienced in Segway.

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# Highlights

Our project is working with two pieces of software which have been fully developed by other people, because of this much of the work in the beginning will be understanding these different software and how to use them. That is we will begin with a "spike test" which is a process in agile development in which we will spend our first week gathering information about both Galaxy and Segway so that we are able to make informed decisions when we begin building.

After meeting with our project partner and discussing options we have decided to hold meetings weekly or bi-weekly (depending on availability).
In these meetings our partner will provide us with information on Segway which they deem important.
The way that Galaxy works is that for each operation you which to use, a "tool" must be created for Galaxy to use, that is to say for each command one wishes to send to Segway a tool must be created so that Galaxy is able to interrupt the user's request, send it appropriately to Segway, and interpret the returned data.
Our plan is to meet weekly, our partner will demonstrate a certain functionality of Segway which they deem necessary to the MVP (as they understand Segway far more than we ever could) and we will take that information, build the tool interface, test, and deploy.
We will continue this process on a rolling basis until we are satisfied with the functionality of our product (or possibly due to time constraints partner has specified a minimum, that is a very specific set of instructions they wish to be able to use Galaxy for). After this MVP with any remaining time we will continue to add functionality to the Galaxy-Segway interface, such as conversion from raw genomic data into the genometools format..
We have chosen this approach as opposed to simply reading the Segway API itself because at our first meeting the partner expressed they have a certain set of functionality they want and a process (for example certain commands must be implemented before others).