



# AI4Agile Alpha Prototype

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# Overview





# Scope

## ICSE SCORE 2021 Requirements

### Project Scope:

1. Recommend user stories that are decomposed from an epic
2. Recommend smaller user stories are split from bigger user stories
3. Recommend subtasks derived from a user story.
4. A visualization (e.g. a graph) of epics, user stories and tasks, and their relationships.

### Environmental Constraints:

- The app must be integrated into the JIRA platform.



# About Jira

## Jira Platform:

- Jira Software - Agile Development Management
- Jira Service Management - Deployment
- Jira Core - Administration (marketing, HR, legal, etc.)

## Jira Software:

- Server - Hosted locally (On-premises service)
- Cloud - Hosted by Atlassian (Cloud service)



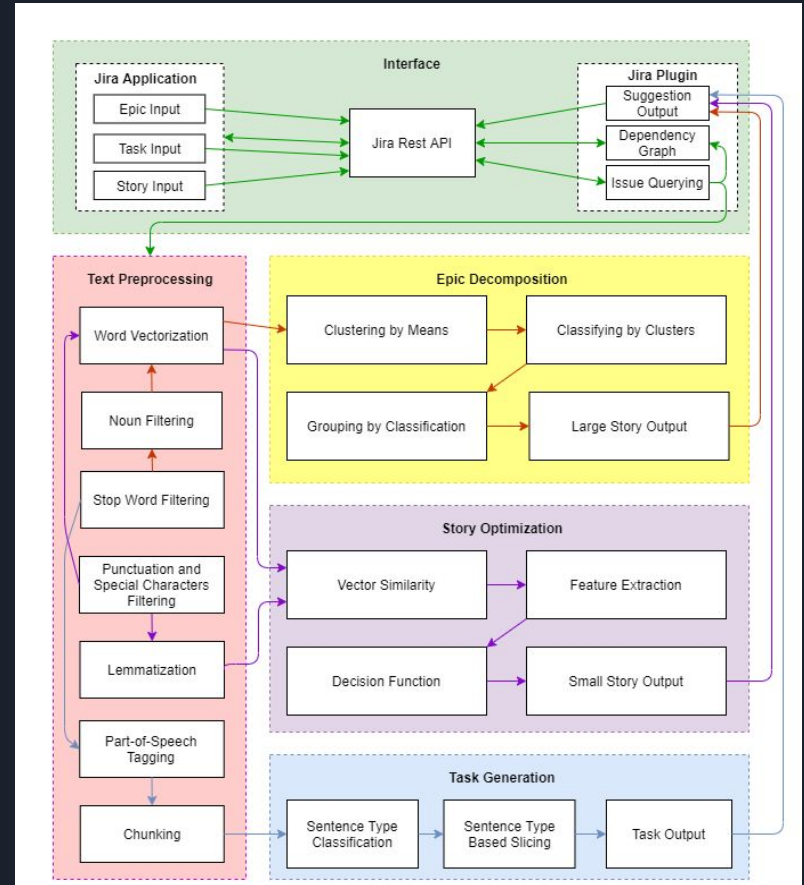
## Vision

The AI4Agile application aims to lessen the administrative time associated with the creation and assignment of stories and tasks in Jira, through use of artificial intelligence and visualization aids.

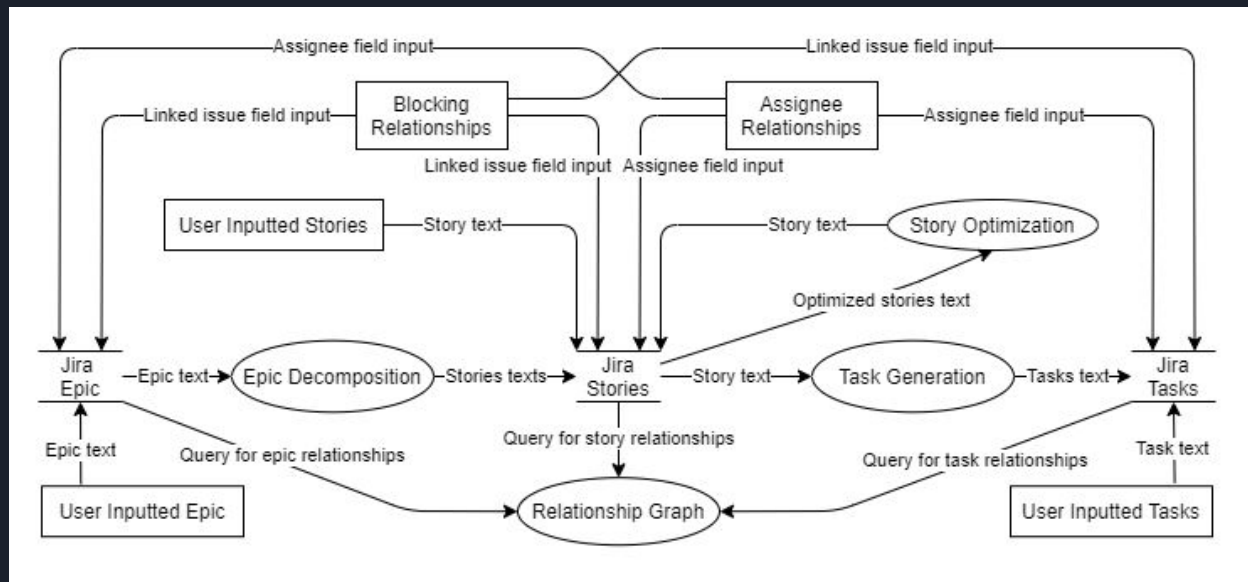
# Design and Architecture

The AI4Agile plugin is comprised of five blocks:

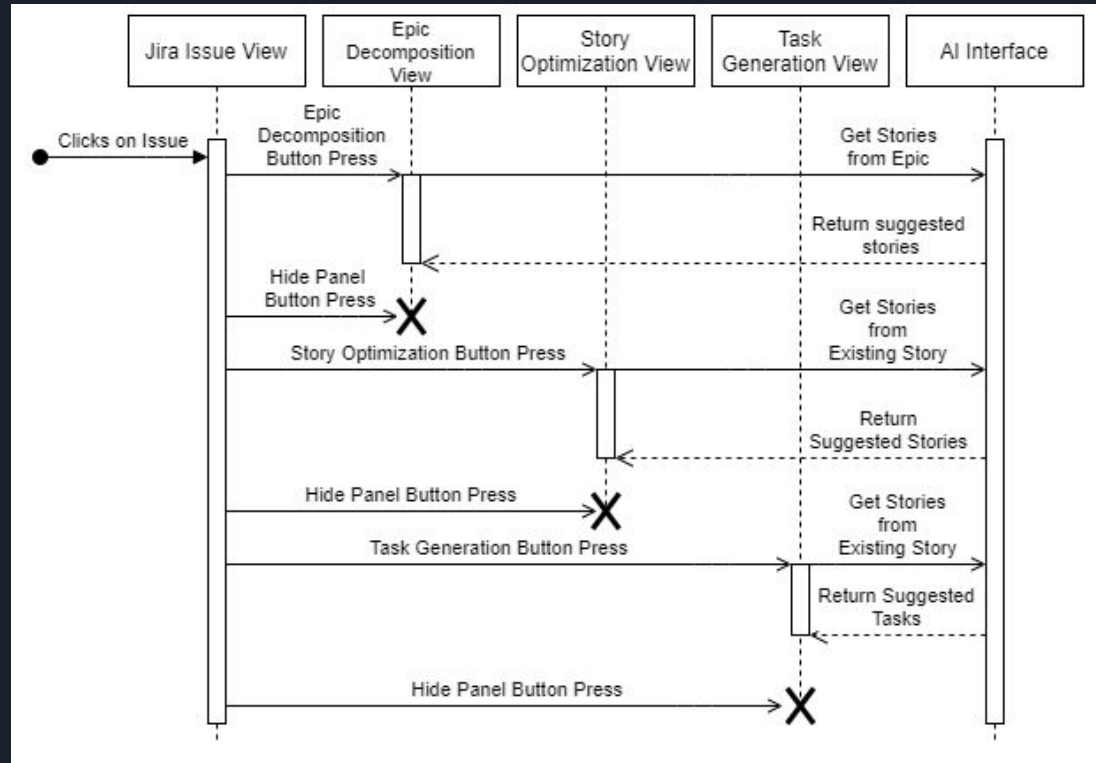
1. Interface
2. Text Preprocessing
3. Epic Decomposition
4. Story Optimization
5. Task Generation



# Dataflow



# Suggestion Web Panel Sequence








# Supported Features

- Iterative suggested issue creation process
  - All suggestions are editable
- Select or deselect suggestions
- Epic Decomposition
  - Slider to select amount of created stories
- Story Optimization
  - Slider to select connectivity degree of optimized stories
- Task Generation
- Relationship Graph
  - Issue Tree
  - Developer Clusters



# User Interface and Experience

## Following Jira paradigms

- Making use of tooltips
- Integrated processes vs pop-out windows

## AUI components and CSS

- Used Atlassian User Interface library components where possible, so items such as buttons and boxes wouldn't look out of place in Jira

## Focus on ease of use for speed

- Suggestion list instead of interactive chatbot
- Select/Deselect all option
- Button placement for

## Simplicity to lessen learning time

- Analyzing impact of any steps or buttons to be added



# Epic Decomposition

## Current Implementation:

- K-means Clustering
  - Centroid-based clustering
  - Vocabulary of Nouns
  - Filtering Stopwords
  - Non-deterministic

## Benefit:

- Predetermined number of clusters

## Limitation:

- User must select the desired number of stories

## Intended Implementations:

- DBSCAN/OPTICS
  - Density-based clustering
- Mean-shift
  - Centroid-based clustering

## Benefit:

- Dynamic number of clusters

## Challenge:

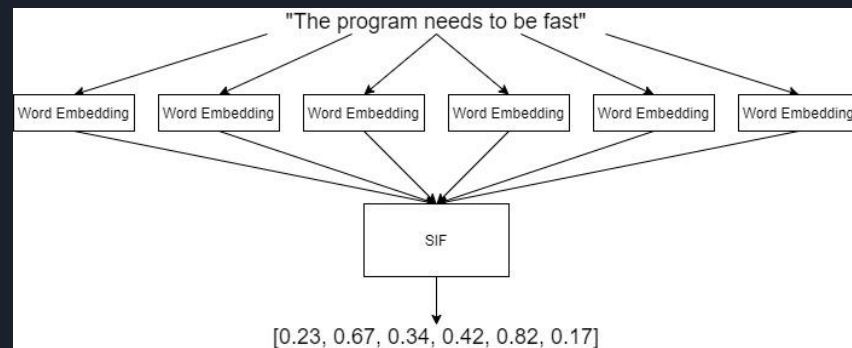
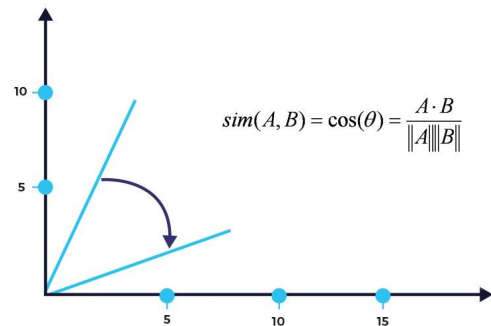
- Filtering noise to yield meaningful clusters

# Story Optimization

Story Optimization has three main components:

- Google Word2Vec
- SIF
- Cosine Similarity
- Function decision

Cosine Similarity



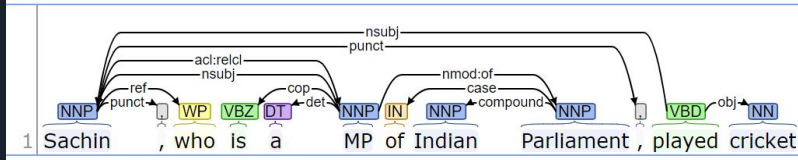
# Task Generation

## Current Implementation: Stanza library

- Simple sentence creation
- Reduction of complex and compound sentences
- Part-of-speech tagging
- Enhanced word dependency

Sachin, who is a MP of Indian Parliament, played cricket

### Enhanced++ Dependencies:

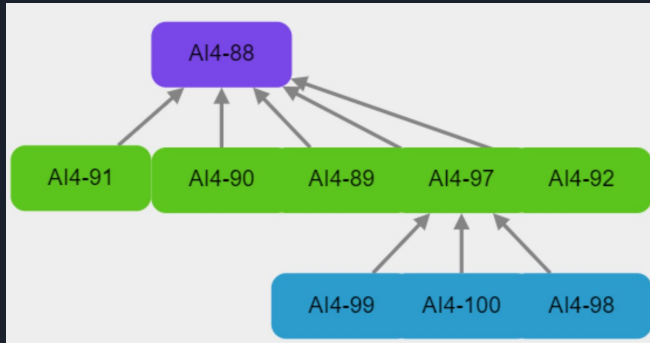


‘Sachin Tendulkar is a MP of Indian Parliament’.

Similarly, we get the second sentence ‘Sachin Tendulkar played cricket’.

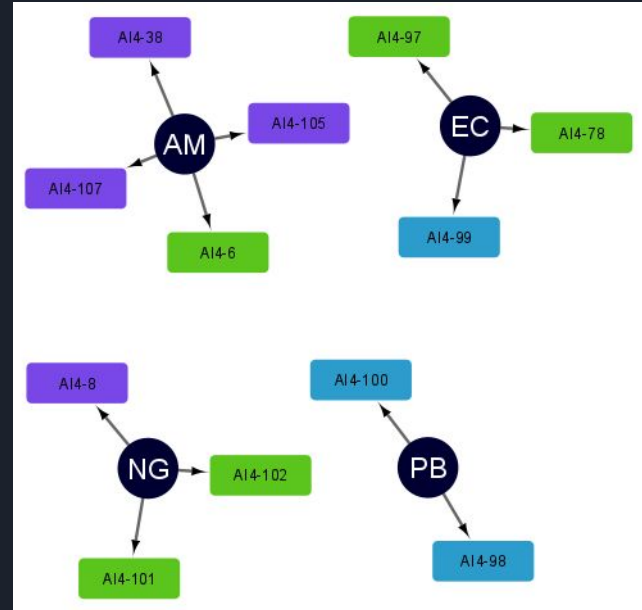
```
nsubj(MP-6, Sachin-1)
nsubj(played-11, Sachin-1)
ref(Sachin-1, who-3)
cop(MP-6, is-4)
det(MP-6, a-5)
acl:relcl(Sachin-1, MP-6)
case(Parliament-9, of-7)
compound(Parliament-9, Indian-8)
nmod:of(MP-6, Parliament-9)
root(ROOT-0, played-11)
obj(played-11, cricket-12)
```

# Visualization



## Issue Tree

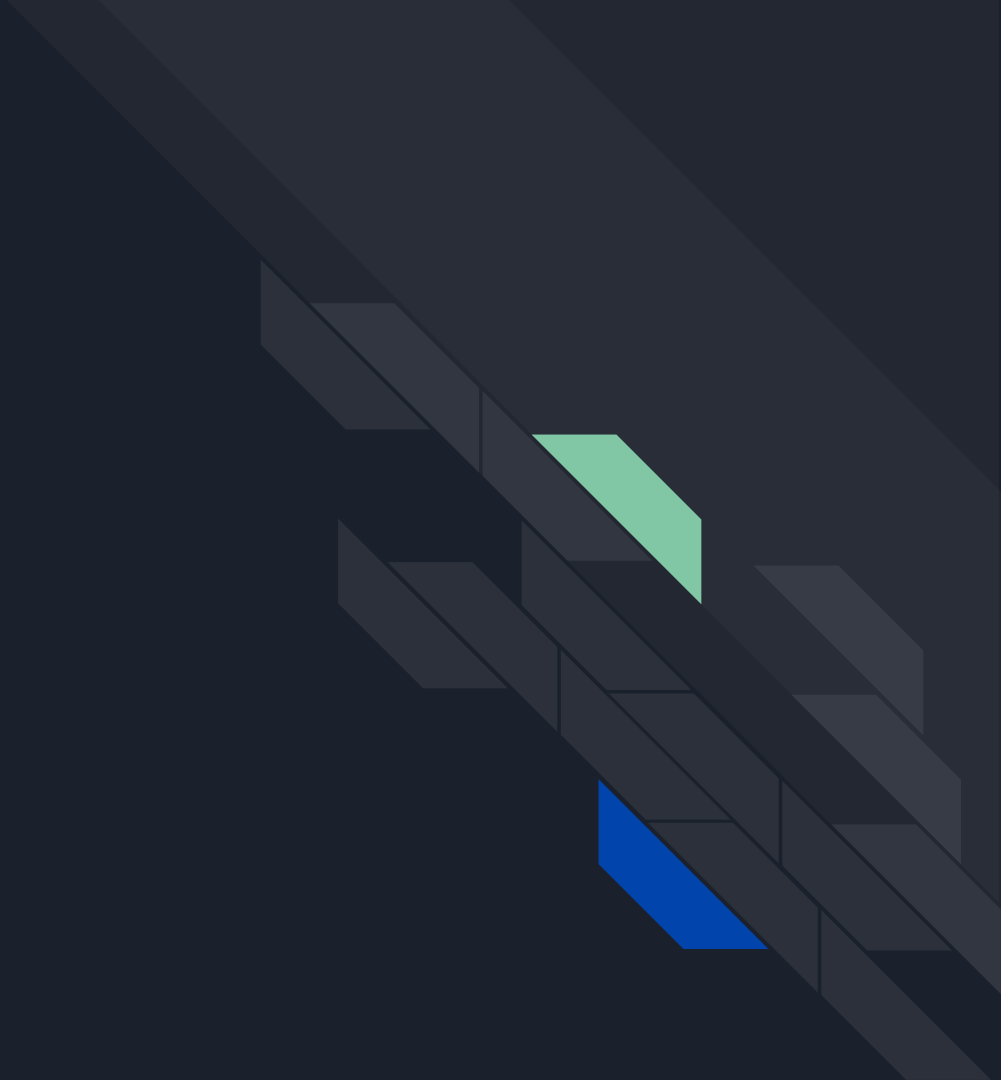
- Graph of explicit blocking relationships
- Can be manually input via Jira fields (“Linked Issues”), or by implicit hierarchy.
- The purpose of this graph is for users to be able to see at a glance where a specific issue falls in relation to others.



## Developer Clusters

- Graph of implicit assignee relationships
- Assignee is a default field in Jira. While it is already possible to show only issues assigned to a certain developer, Jira’s format for showing multiple people’s assignments is lacking.

Demo



Future







# Future Focus

For the next phase of development, the customers in focus are Scrum Masters and software developers. The problems that this product aims to solve or improve for them in the next release are:

- Scrum Masters: time costs in breaking down epics, and availability of information for decision making
- Software developers assigned a specific story: time costs of task derivation



# Future Features

## Epic Decomposition:

- Dynamic Clustering

## Task Generation:

- Improved generation results

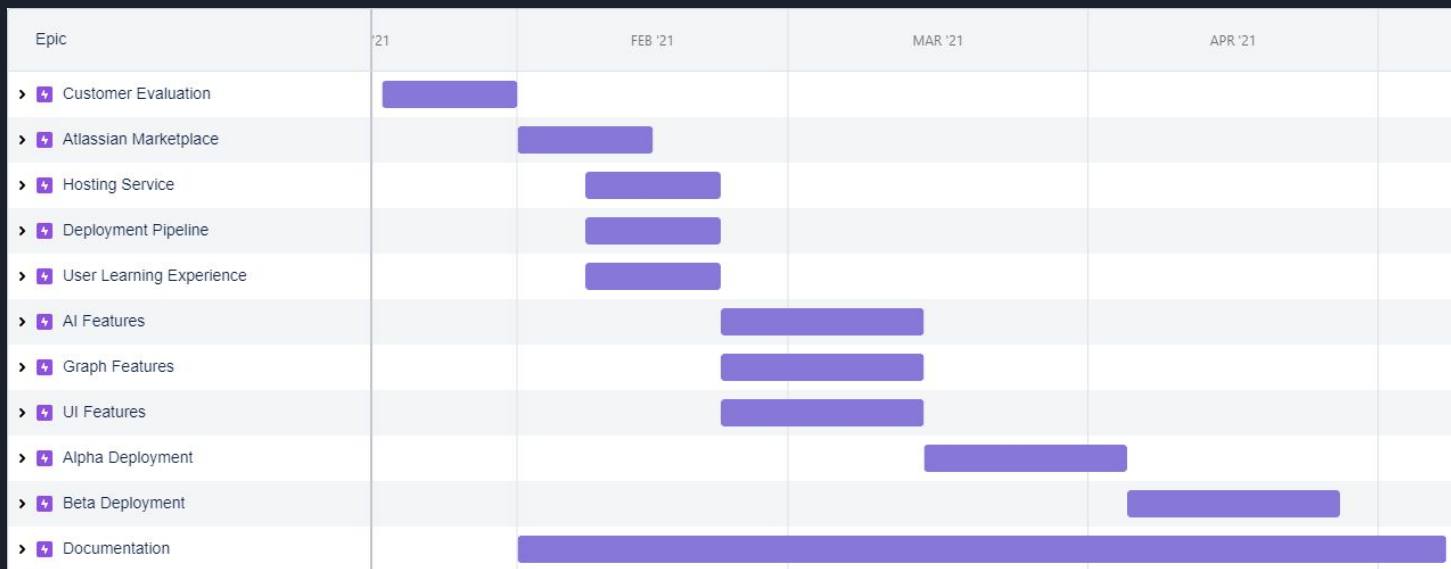
## Story Optimization:

- Algorithm optimization for quicker results

## Relationship Graph:

- Additional options for relationship/field types to show
- Filtering options
- Ease-of-use controls

# Tentative Future Schedule



Questions?

