Optimization Model for Scrum-based Software Development

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1 Sets (Entities)

- Projects
- Teams
- Workers
- Features
- Skills
- Roles
- Product Owners
- Scrum Masters
- Product Backlogs
- Sprints
- Sprint Goals
- Tasks

- Blockers
- Stakeholders
- Release Plans
- Roadmaps
- Scrum Boards
- Development Snapshots

2 Indices

- $p \in P$: Projects
- $t \in T$: Teams
- $w \in W$: Workers
- $f \in F$: Features
- $s \in S$: Sprints
- $g \in G$: Sprint Goals
- $k \in K$: Tasks
- $b \in B$: Blockers
- $h \in H$: Stakeholders

3 Goals

- G_0: Maximize project budget $\max \sum_{p \in P} budget_p$
- G_1: Minimize project duration $\min \sum_{p \in P} (project\_end_p - project\_start_p)$
- G_2: Maximize team size $\max \sum_{t \in T} team\_size_t$
- G_3: Minimize blocker severity $\min \sum_{b \in B} severity_b$
- G_4: Maximize velocity $\max \sum_{t \in T} avg\_story\_points_t$
- G_5: Maximize sprint goal achievement $\max \sum_{g \in G} achievement\_status_g$

4 Conditions

- C_0: Ensure project start date is set $\forall p \in P : project\_start_p \leq project\_end_p$
- C_1: Ensure team location is specified $\forall t \in T : location_t \neq \emptyset$
- C_2: Blockers must be resolved $\forall b \in B : status_b = resolved$
- C_3: Sprint goal must be defined $\forall g \in G : objective\_description_g \neq \emptyset$

5 Decision Variables

- D_0: Project start date $project\_start\_date \in \{YYYY - MM - DD\}$
- D_1: Team size $team\_size \in Z^+$
- D_2: Blocker resolution time $blocker\_resolution\_time \in Z^+$
- D_3: Sprint goal achievement $sprint\_goal\_achievement \in \{0, 1\}$