Optimization Model for Scrum-based Software Development

Generated Model

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Contents

1 Sets (Entities)

- Projects (P)
- Teams (T)
- Workers (W)
- Features (F)
- Blockers (B)
- Sprints (S)
- Tasks (TSK)
- Stakeholders (SH)
- Product Owners (PO)
- Scrum Masters (SM)
- Development Snapshots (DEV)
- Release Plans (REP)
- Roadmaps (RM)

2 Indices

- $p \in P$ (Projects)
- $t \in T$ (Teams)
- $w \in W$ (Workers)
- $f \in F$ (Features)
- $b \in B$ (Blockers)
- $s \in S$ (Sprints)
- $tsk \in TSK$ (Tasks)
- $sh \in SH$ (Stakeholders)
- $po \in PO$ (Product Owners)
- $sm \in SM$ (Scrum Masters)

3 Goals

- Maximize project budget: $\max \sum_{p \in P} budget_p$ (G0)
- Minimize project duration: $\min \sum_{p \in P} (project\_end_p - project\_start_p)$ (G1)
- Maximize team size: $\max \sum_{t \in T} team\_size_t$ (G2)
- Maximize worker availability: $\max \sum_{w \in W} availability_w$ (G3)
- Minimize blocker severity: $\min \sum_{b \in B} severity_b$ (G4)
- Maximize sprint velocity: $\max \sum_{s \in S} avg\_story\_points_s$ (G5)

4 Conditions

- Ensure project status is active: $status_p = Active, \forall p \in P$ (C0)
- Ensure team status is active: $team\_status_t = Active, \forall t \in T$ (C1)
- Ensure worker availability is above threshold: $availability_w \geq threshold, \forall w \in W$ (C2)
- Ensure blockers are resolved: $status_b = Resolved, \forall b \in B$ (C3)
- Ensure sprint goals are achieved: $achievement\_status_s = Achieved, \forall s \in S$ (C4)

5 Decision Variables

- Project allocation: $x_p \in \{0, 1\}, \forall p \in P$ (D0)
- Team size decision: $y_t \in \{5, 10, 15\}, \forall t \in T$ (D1)
- Worker availability threshold: $z_w \in [0, 1], \forall w \in W$ (D2)
- Blocker resolution priority: $priority_b \in \{1, 2, 3\}, \forall b \in B$ (D3)
- Sprint goal achievement target: $target_s \in [0, 1], \forall s \in S$ (D4)