

Flowable Hands-on Exercise: Multi-Instance Sub-Process & Aggregation

Scenario: Employee Performance Evaluation

A company conducts quarterly performance evaluations for employees. Each employee's performance is **evaluated by multiple reviewers**, and the process aggregates their scores to determine the final decision.

This exercise will demonstrate how to use:

- ✓ **Multi-Instance Sub-Process** to evaluate multiple employees in parallel.
 - ✓ **Aggregation** to compute the average score and decide if an employee qualifies for a promotion.
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Step 1: Create a New Process in Flowable

1. Open **Flowable Modeler**.
 2. Create a new **BPMN Process Model** named **Employee Evaluation Process**.
 3. Set **Process ID** as `employeeEvaluationProcess`.
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Step 2: Define Process Flow

1 Start Event

- Drag a **Start Event** onto the canvas and label it **Evaluation Started**.

2 Multi-Instance Sub-Process (for multiple employees)

- Drag a **Sub-Process** onto the canvas.
- Select the Sub-Process and enable **Multi-Instance (Parallel)**.
- Label it **Evaluate Employees**.
- Set the loop cardinality as the number of employees:
`${employees.size() }`

This assumes `employees` is a **list of employee objects** passed as a process variable.

3 User Task for Reviewers (inside Sub-Process)

- Inside the Multi-Instance Sub-Process, add a **User Task** labeled **Review Employee**.
- Assign it to a candidate group: `reviewers`.

4 Aggregation (Script Task for Score Calculation)

- Add a **Script Task** after the Multi-Instance Sub-Process.
- Label it **Calculate Final Score**.

- Add the following script to compute the **average evaluation score**:

```
var totalScore = 0;
var numberOfEvaluations = employees.size();

for (var i = 0; i < numberOfEvaluations; i++) {
    totalScore += employees.get(i).score;
}

var averageScore = totalScore / numberOfEvaluations;
execution.setVariable("averageScore", averageScore);
```

5 Decision Gateway (Promotion Decision)

- Add an **Exclusive Gateway** labeled **Check Promotion Eligibility**.
- Add two paths from the gateway:
 - **"Promote Employee" (User Task)** if `averageScore >= 8`.
 - **"No Promotion" (End Event)** if `averageScore < 8`.

6 End Events

- Connect both paths to **End Events**:
 - "Promotion Granted"
 - "Evaluation Completed"

Step 3: Define Multi-Instance Configuration

- Select the **Multi-Instance Sub-Process**.
- Set **Collection Variable**: `employees`.
- Set **Element Variable**: `employee`.
- Execution Mode: **Parallel** (so all employees are evaluated simultaneously).

Step 4: Deploy and Test

1. Deploy the process in Flowable.
2. Start a new process instance with a list of employees:

```
{
  "employees": [
    { "name": "John", "score": 9 },
    { "name": "Emma", "score": 7 },
    { "name": "Liam", "score": 8 }
  ]
}
```

3. Each employee is assigned for review, and the process computes the **average score**.
4. If the average is **8 or higher**, they get a **promotion**; otherwise, the process ends.

Expected Behavior

Employee	Score	Review Task	Aggregated Score	Decision
John	9	✓ Completed	8.0	✓ Promotion
Emma	7	✓ Completed	8.0	✓ Promotion
Liam	8	✓ Completed	8.0	✓ Promotion

For { "employees": [{ "name": "Alex", "score": 5 }, { "name": "Sara", "score": 6 }] },

- **No Promotion** since the average is **5.5**.