

Enhancing Workflow in APEX with Flows for APEX: An Introduction and Update



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Director
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richard@flowquest.net





Richard Allen – About Me



Richard@Flowquest.net

@FlowquestR

Using Oracle since V4.1 (1985)

Ex-Oracle (twice!)

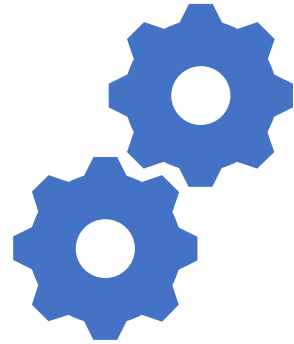
Lived in UK, US, Singapore and Malaysia

Developing Flows for APEX since 2020

Started Flowquest Limited to further develop Flows for APEX and support our enterprise users



Warning!



Workflow is a big and complex topic, with many moving parts.



In 50 minutes, we can't cover everything...
There is more detail in the slides.

Agenda

01

Intro to
Flows for APEX
and basic demo

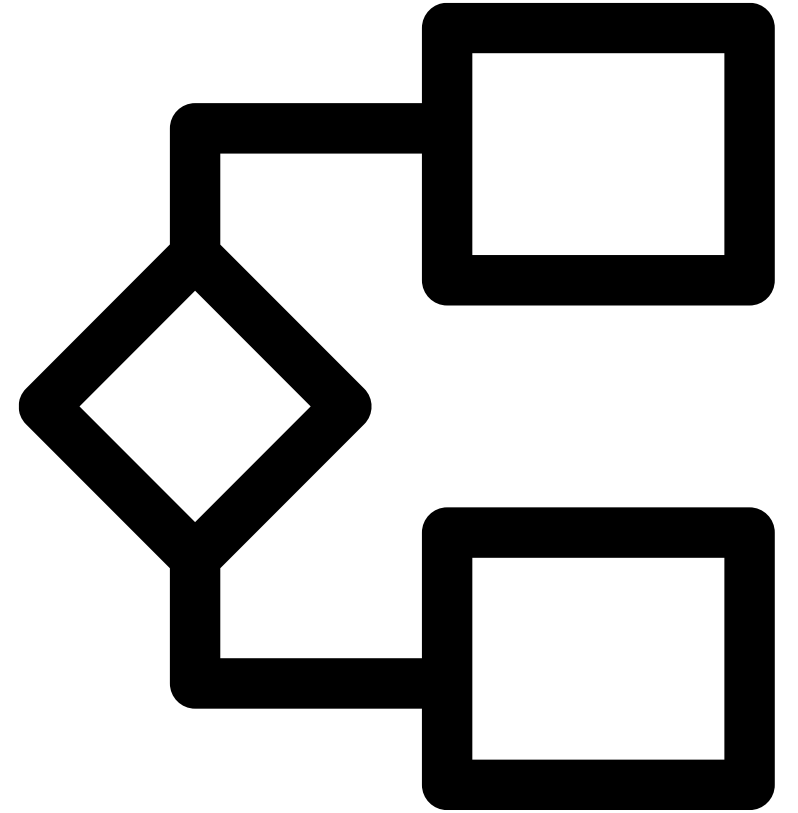
02

Key Workflow
Features

03

What's New

What is Flows for APEX?



Flows for APEX - BPMN based Workflow for APEX



Flows for APEX

Dashboard | Flow Management | Flow Monitor

Flow Monitor | Export Parts Order - New Engines for A320 D456

Instance Details

ID	5129
Name	Export Parts Order - New Engines for A320 D456
Model	Process Large Export Order - Version 1
Status	running
Initialized On	28.09.2022 11:47:59
Last Update On	28.09.2022 11:47:59
Business Reference	1126

Instance Events

Subflows Variables

Q Go Rows 50 Actions Reset

Status in 'running, error, waiting for timer'

	Quick Action	Current	Last Update	Status	Lane	Reserved For	Level
<input type="checkbox"/>		Export Doc Reminder	28.09.2022 11:49:29	waiting for timer @ 30.09.2022 11:49:29	EXPORT_COMPLIANCE		0
<input type="checkbox"/>		arrange surface shipment	28.09.2022 11:49:29	running	OPS		0
<input type="checkbox"/>		create LC docs	28.09.2022 11:49:29	running	EXPORT_COMPLIANCE		0
<input type="checkbox"/>		Sub Task A	28.09.2022 11:49:29	running	EXPORT_COMPLIANCE		21749

1 - 4

Flow Viewer (Export Parts Order - New Engines for A320 D456)

Process Large Export Order (Level: 0)

Design and define your business processes

Develop them into APEX applications

Execute instances of the process

Monitor running process instances

6

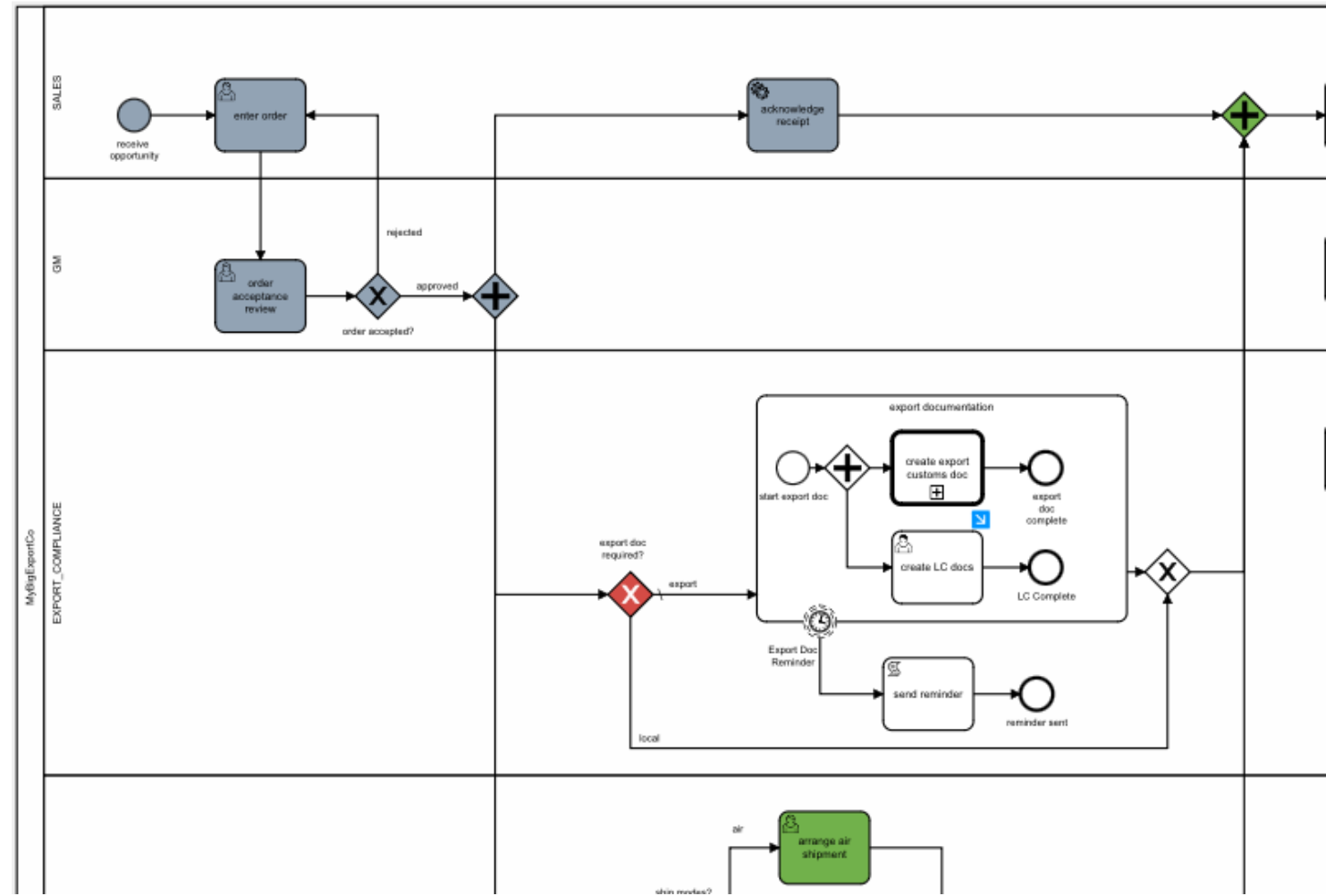
Report on process performance

Flows for APEX is a BPMN 2.0 based Workflow System for APEX Developers

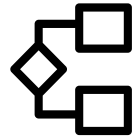


Business Process Model and Notation (BPMN) 2.0 is the accepted standard for Business Process Modelling.

- allows modeling of simple AND complex business processes
- standard graphical notation that allows communication between business and IT
- And ... it's understood by LLMs, e.g., gpt-4o, can explain, debug, translate and advise on BPMN processes.

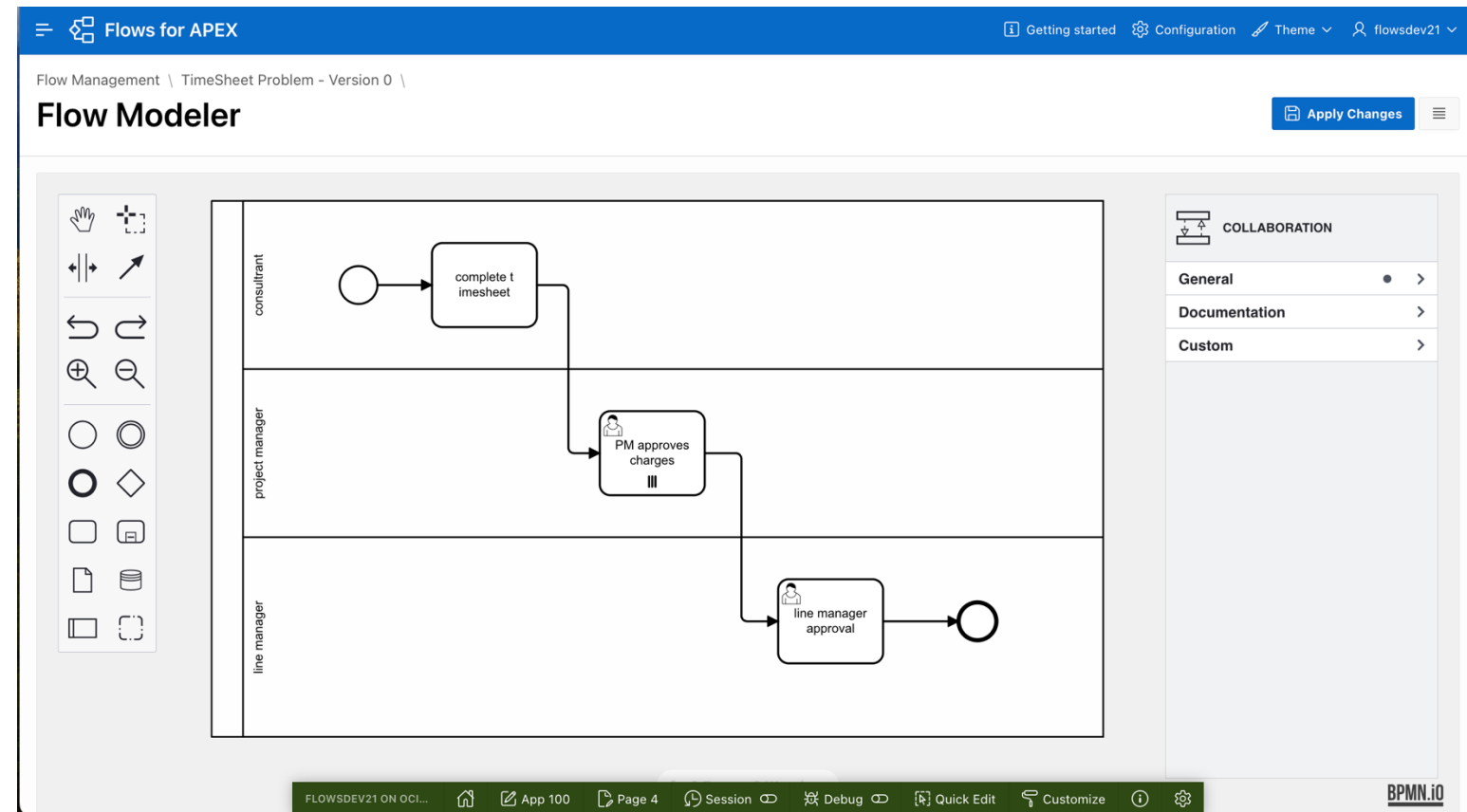


...Business Process Modeler



Powerful, Easy to Use Modeler

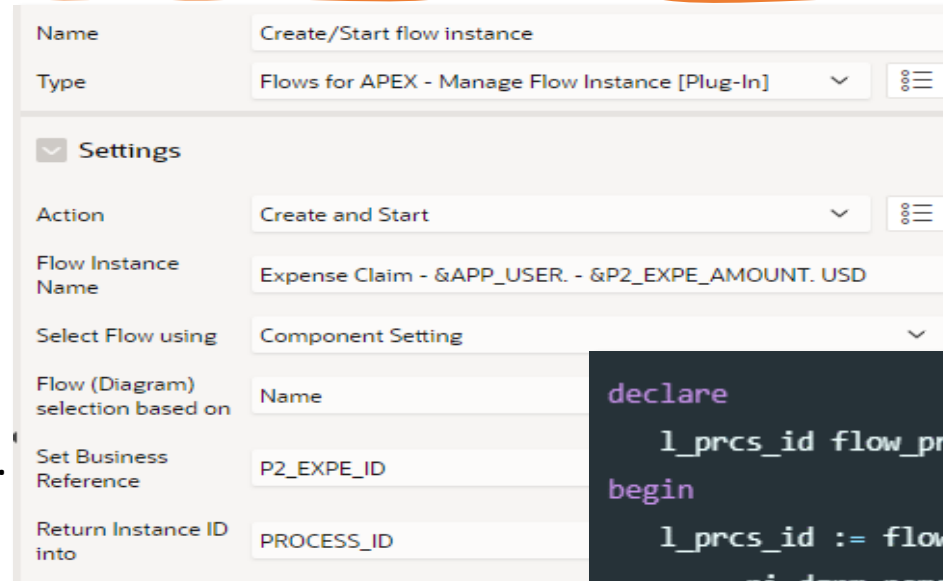
- Modeler runs in the Flows for APEX Application using the bpmn.io modelers and viewers
- Top-down process modeling and design
- Models are stored in Oracle as both BPMN / XML and in a parsed / relational format.



...Declarative Integration into APEX

Development, APEX-style!

- Declarative Development
- Uses SQL and PL/SQL API
- REST Enabled for remote calling
- Leverages Oracle and APEX
- Separate Process Logic from App Logic...



The screenshot shows the 'Create/Start flow instance' configuration window in APEX. It includes fields for Name, Type, Action, Flow Instance Name, Select Flow using, Flow (Diagram) selection based on, Set Business Reference, and Return Instance ID into.

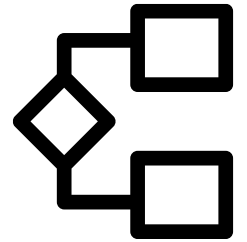
Name	Create/Start flow instance
Type	Flows for APEX - Manage Flow Instance [Plug-In]
Settings	
Action	Create and Start
Flow Instance Name	Expense Claim - &APP_USER. - &P2_EXPE_AMOUNT. USD
Select Flow using	Component Setting
Flow (Diagram) selection based on	Name
Set Business Reference	P2_EXPE_ID
Return Instance ID into	PROCESS_ID



```
declare
    l_prcls_id flow_processes.prcls_id%type;
begin
    l_prcls_id := flow_api_pkg.flow_create(
        pi_dgrm_name      => 'My Model'
        , pi_dgrm_version => '0'
        , pi_prcls_name    => 'My Instance Name'
    );

    flow_api_pkg.flow_start(
        p_process_id => l_prcls_id
    );
end;
```

...Integrates with APEX Human Tasks and Workflow



Workflow can be integrated into all applications in the Workspace to create consistent interface across many workflows

- In-built tools for process visibility, task inboxes, etc.

The screenshot displays the 'Exco Export Order Process' interface. On the left is a sidebar with navigation links: Home, APEX Unified Task Inbox (selected), Orders, Products, Customers, My Initiated Process Instances, Task Inbox Administration, and Flows for APEX Task Inbox. The main area is titled 'APEX Task Inbox' and features a search bar and filters: 'Due Next 24 hours 7', 'Type enter order 6', 'Priority Medium 10', 'State Unassigned 1', and 'Application Process Large Export Order 9'. Below the filters, there are three task cards. The first card is titled 'Export Parts Order (1082) - &F4A\$Process_Name - Order Acceptance Approval Required' with a status of 'Unassigned' and buttons for 'Approve' and 'Reject'. The second card is titled 'Export Parts Order - JAS Test Dates () - enter order' with a status of 'Ready for Action' and buttons for 'Show Process' and 'Reserve / Claim'. The third card is titled 'Export Parts Order - Date () - enter order' with a status of 'Ready for Action' and buttons for 'Show Process' and 'Reserve / Claim'.

... Includes Process Monitoring, Audit, Stats

Flows for APEX Flow Monitor

- Monitor Process Driven Apps
- Full Logging, Audit, Process Archive features
- Fully leverages Oracle Platform
- Process Performance Statistics and Trends

Stored separately from APEX meta-data.

The screenshot displays the APEX Flow Monitor interface. The left sidebar contains navigation links: Dashboard, Flow Management, and Flow Monitor. The main content area is titled "Export Parts Order - New Engines for A320 D456". It features a "Flow Viewer" on the right showing a process diagram for "Process Large Export Order (Level: 0)". The central panel shows "Instance Details" for instance ID 5129, which is in a "running" status. Below this, the "Instance Events" section includes a table of subflows.

Quick Action	Current	Last Update	Status	Lane	Reserved For	Level
	Export Doc Reminder	28.09.2022 11:49:29	waiting for timer @ 30.09.2022 11:49:29	EXPORT_COMPLIANCE		0
	arrange surface shipment	28.09.2022 11:49:29	running	OPS		0
	create LC docs	28.09.2022 11:49:29	running	EXPORT_COMPLIANCE		0
	Sub Task A	28.09.2022 11:49:29	running	EXPORT_COMPLIANCE		21749

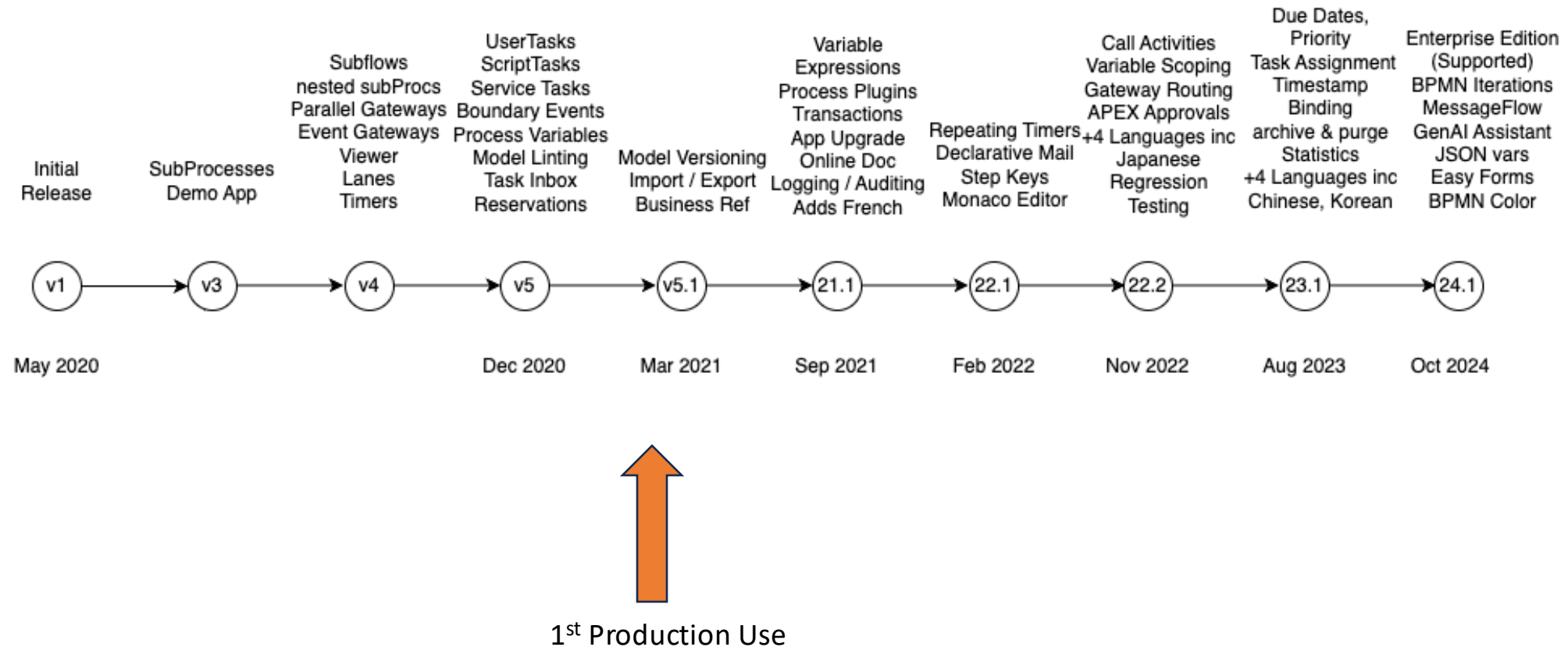




Demo

- Model & Run Simple Model

Flows for APEX Project Releases



The Open Source Project Team



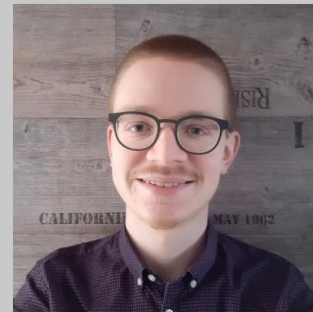
Niels
de Bruijn
Hyand



Richard
Allen
Flowquest



Moritz
Klein
Hyand



Dennis
Amthor
Hyand

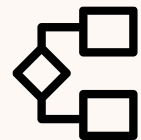


Louis
Moreaux
Insum



Jörg
Doppelreiter
Solicon

A special thanks also goes out to our language translators and proof readers!



Some Flows for APEX Customers in Production or Development



Dealer Management



Major Regional Telco (UAE)
ERP Approval Management



Govt Process Automation
(with Fujitsu)



Oracle
Multiple Production Apps



Patient Billing / Insurance



Israel University Projects



US Defense Contractor
HR Processes



Aviation Charter Reservations
(Insum) (OCI)



Electric Motor Manufacturer
EBS Extension (Insum)



Auto Parts Manufacturer
HR Processes



Fund Management
Customer Support Processes



Nomura Research
AML / NYC System (OCI)



HyperGRC – MyRisk
Security Vulnerability Products
on OCI



UK Royal Navy
HR Processes

Agenda



01

Intro to
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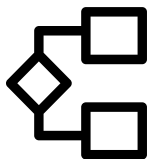
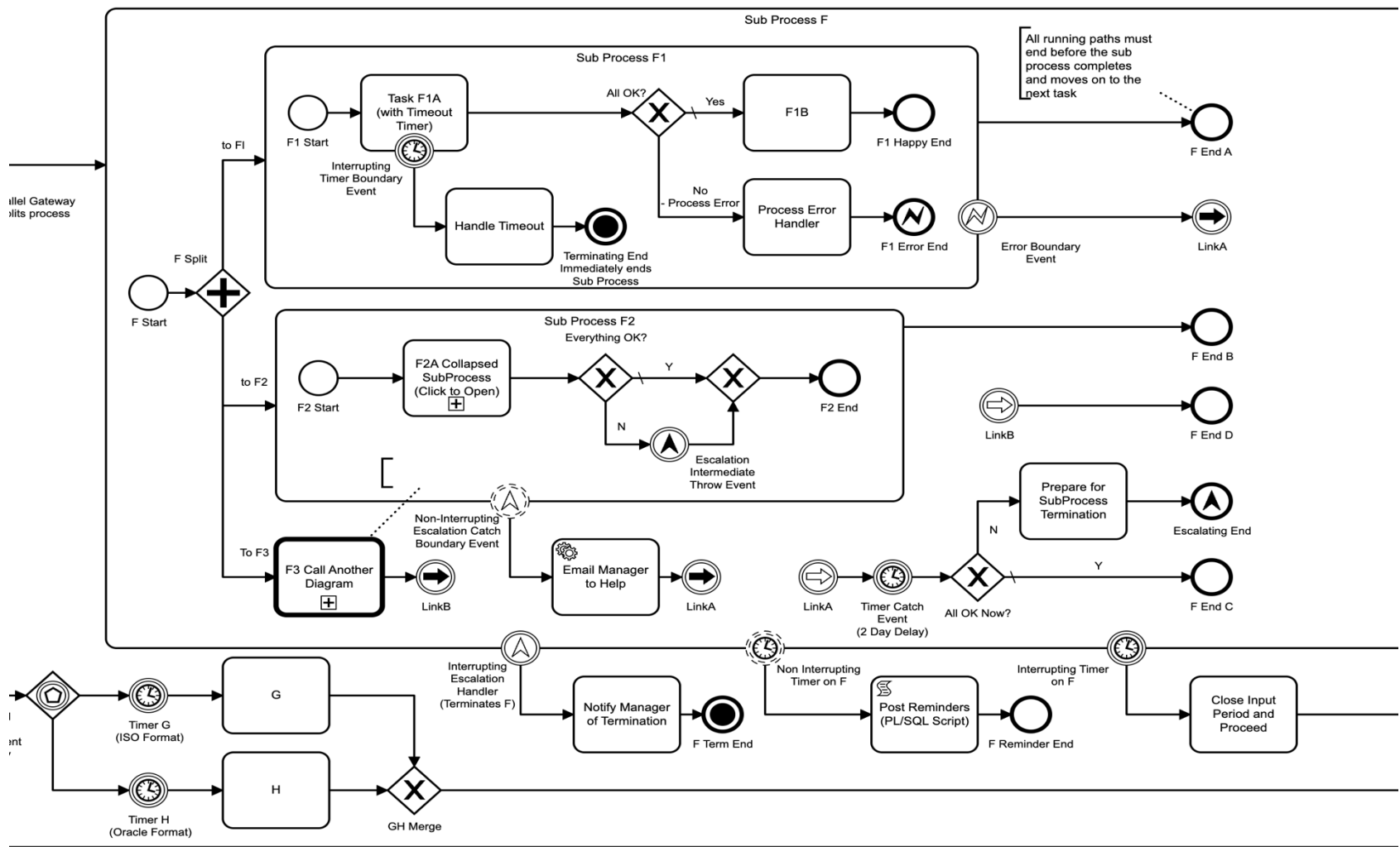
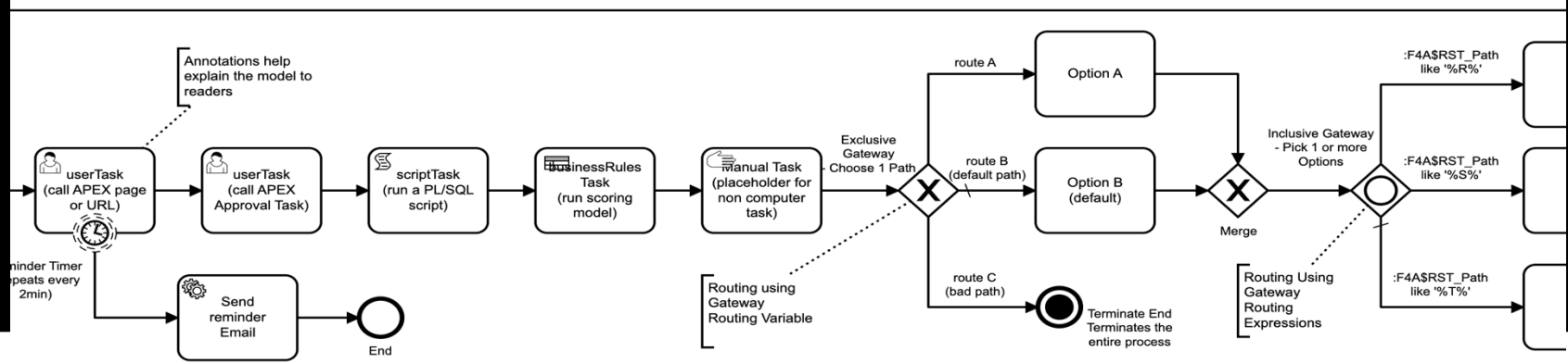
02

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Features

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What's New

More Advanced Features...



Human Task Types – BYO, Use APEX Approvals, or Don't...

APEX Page

Build your own APEX page to collect required data.

Using Flows for APEX process plugins, declaratively connect your task page to the Flows for APEX workflow engine.

APEX Human Task

Use the APEX Approval Task / APEX Action Task tasks from APEX.

APEX manages the task, including delegation, request for information, expiry – returns an Outcome when completed.

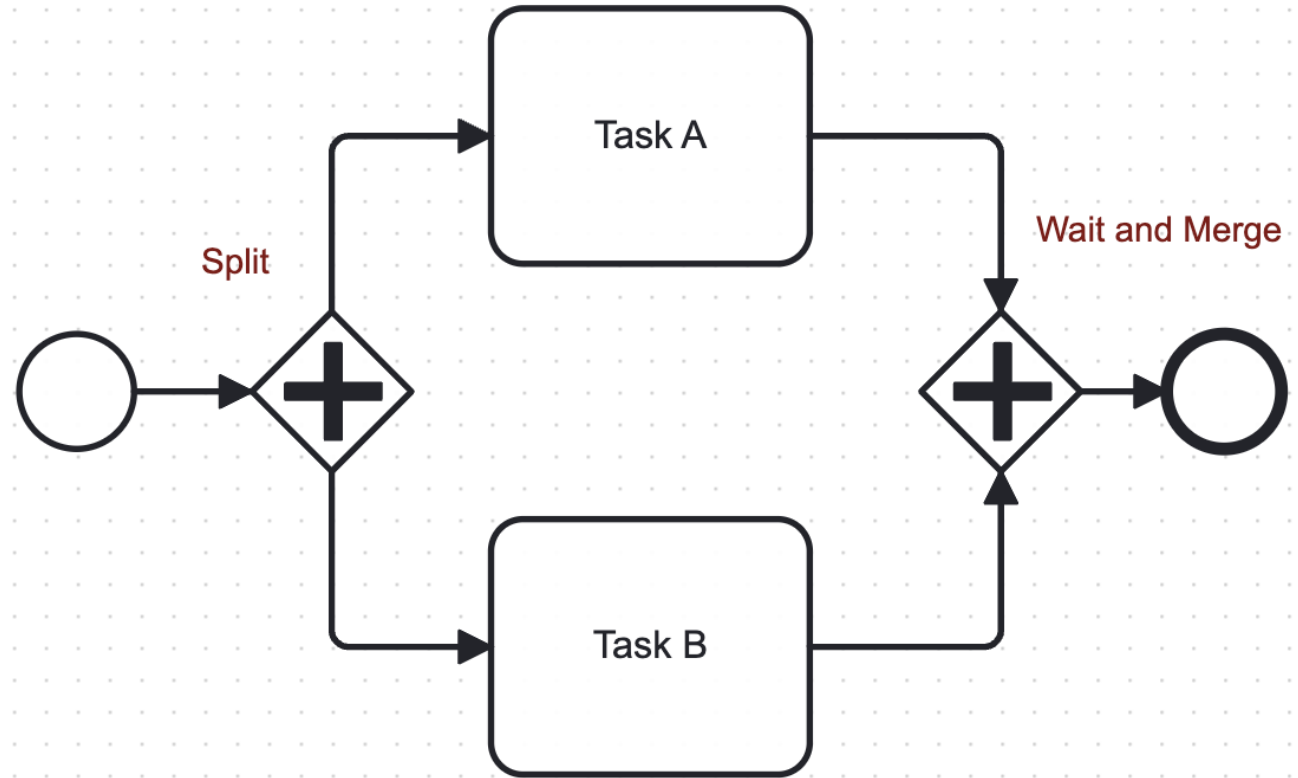
Simple Form

Uses Dynamic JSON Region Plugin from Ewe Simon.

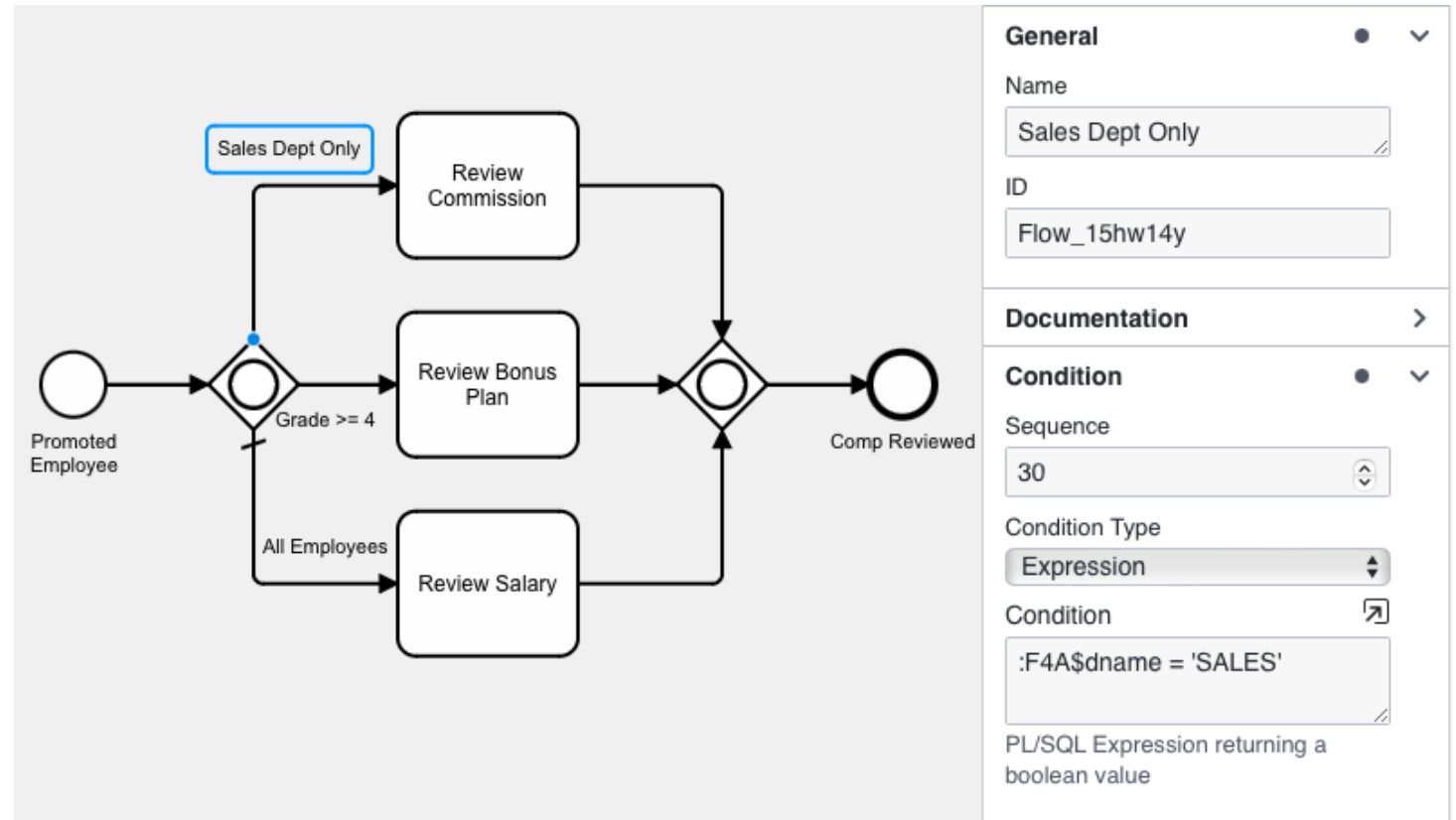
Collect simple form data from users just by specifying a JSON schema of the items required.

Region Plugin dynamically renders APEX page to collect required data, using appropriate APEX Page Items.

Parallel Execution



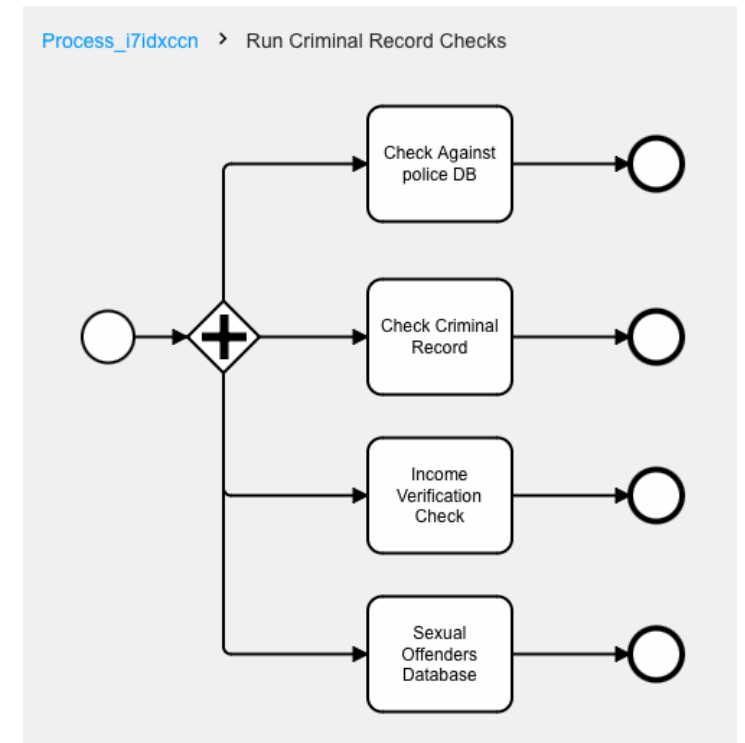
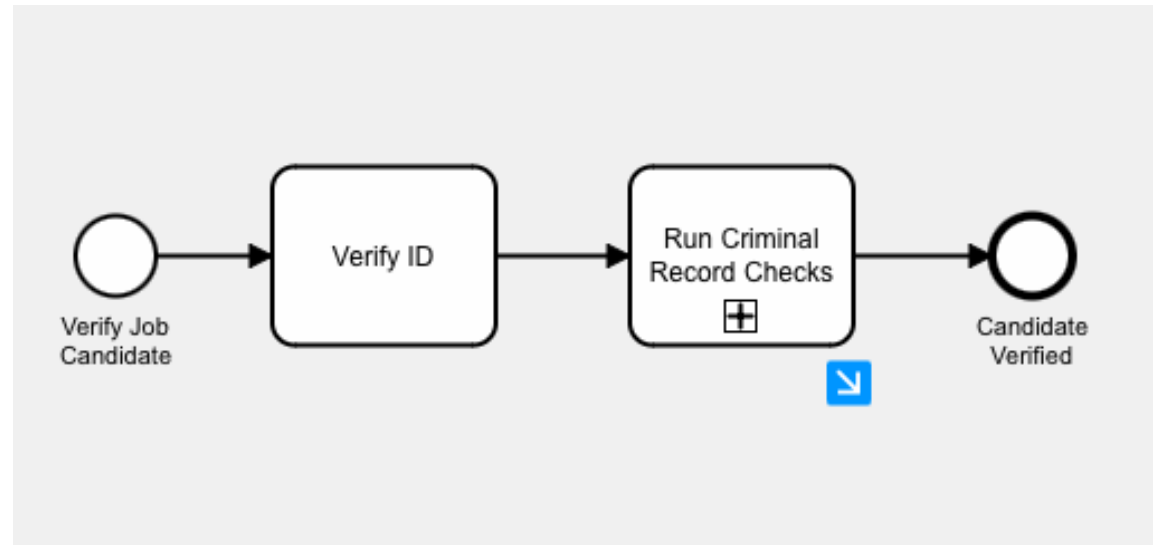
Conditional Parallel Execution



Sub Processes

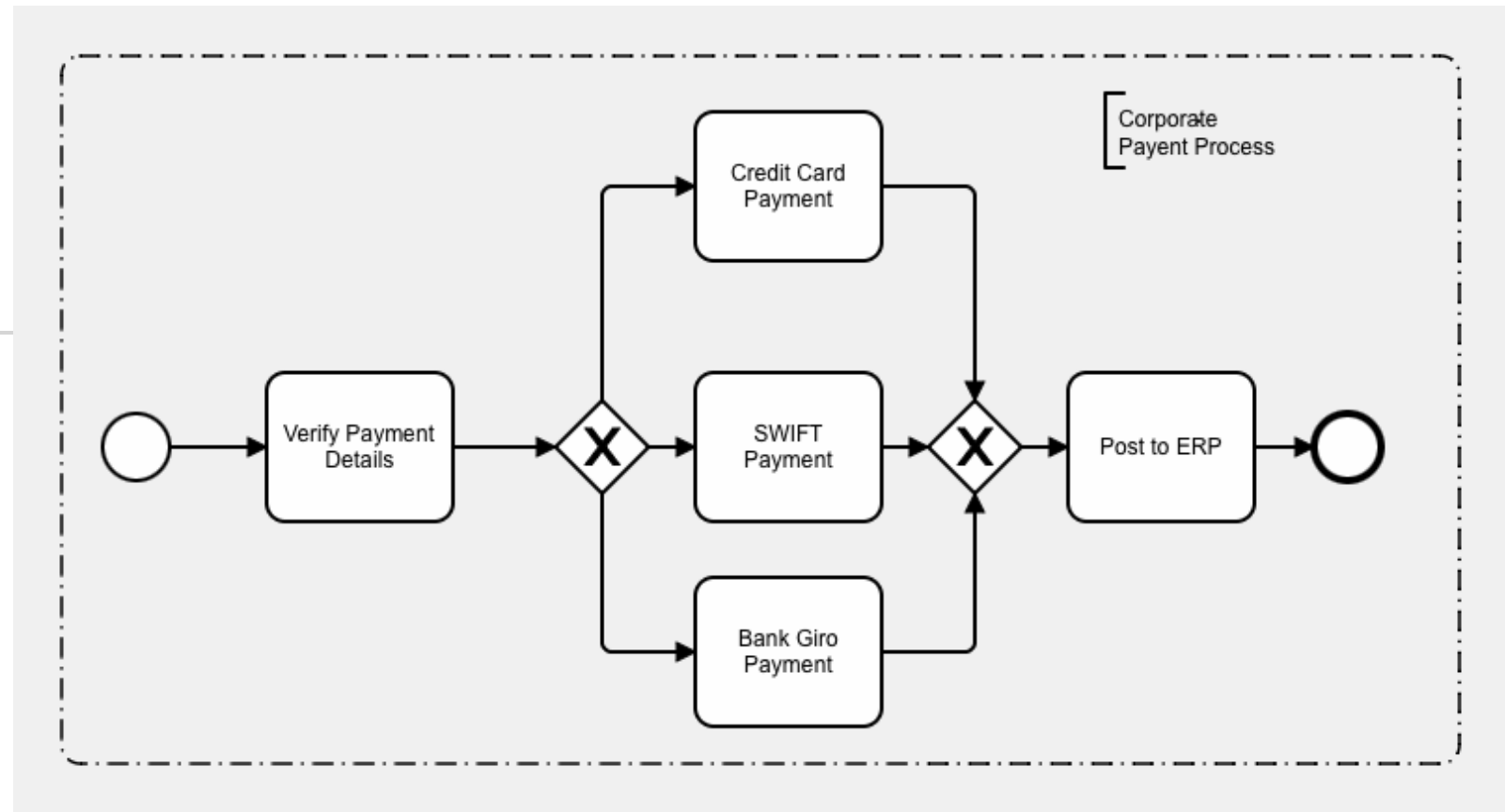
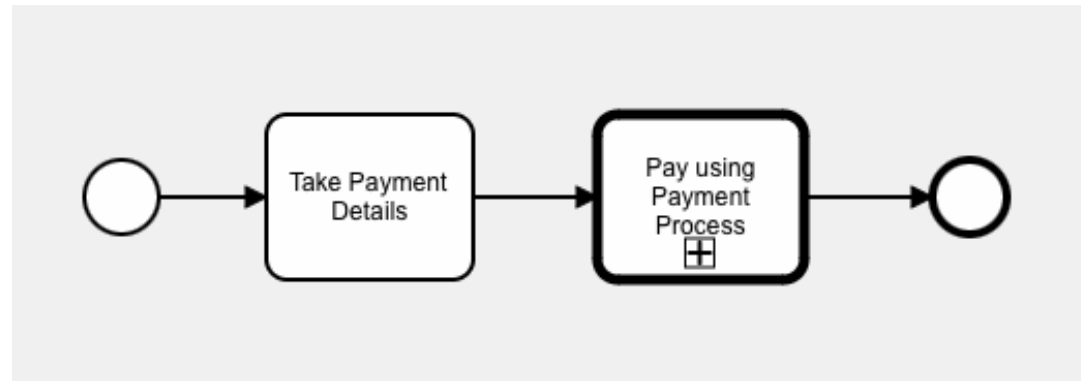
Hide detail within the same process diagram by using Sub Processes...

Drill down to see detail in Modeler and Viewer...



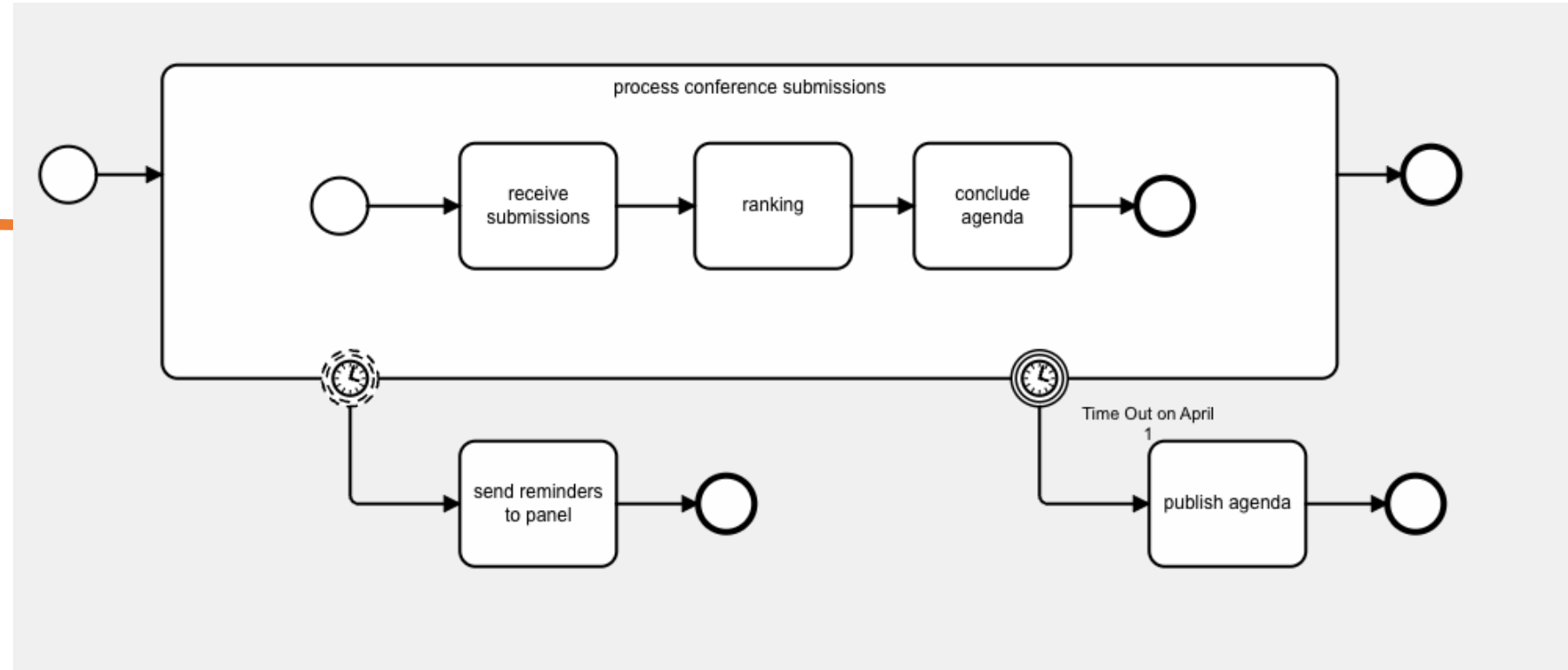
Call Activities

Or have a diagram call another diagram to execute the details...



Timers, Timeouts & Reminders

- Specify process activity for process error and escalation conditions
- - interrupting
- - non-interrupting

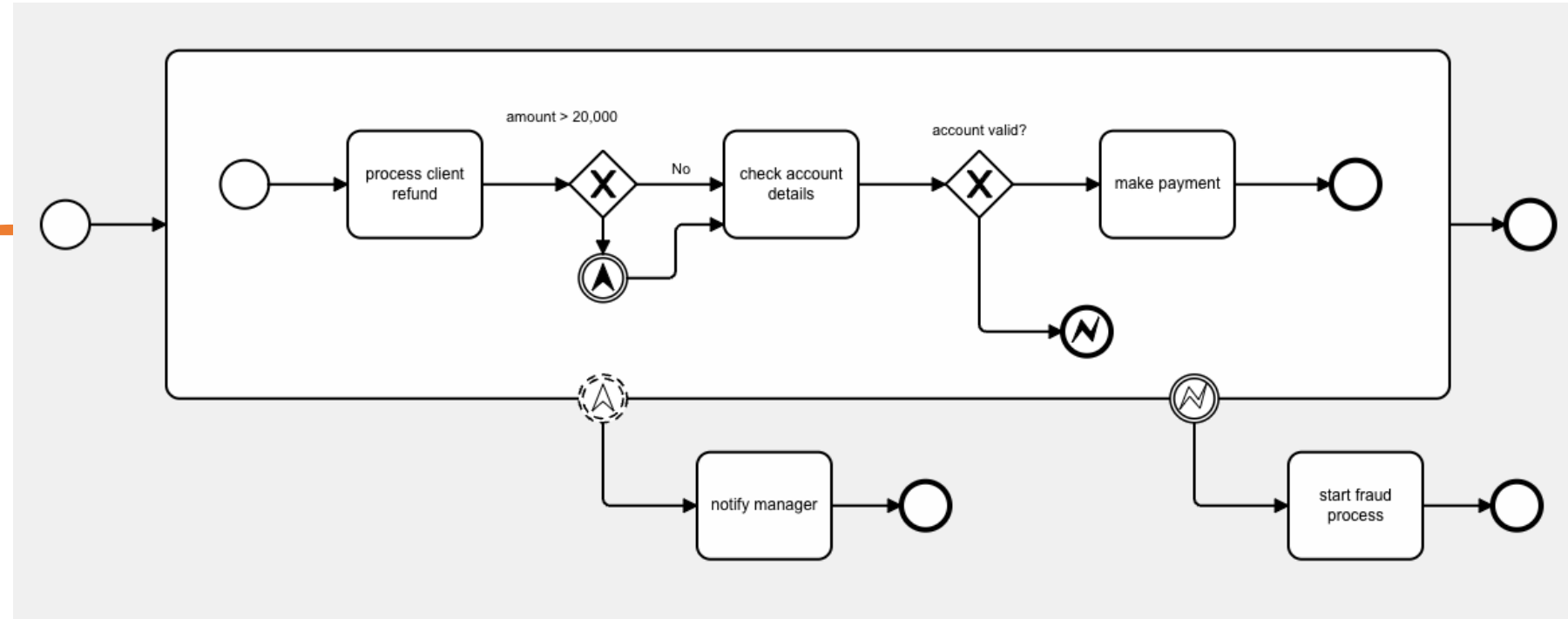


(BPMN Interrupting and Non-Interrupting Timer Events)

Escalations and Errors

Specify process activity for process error and escalation conditions

- interrupting
- non-interrupting



(BPMN Intermediate Catch and Throw Events, BPMN Boundary Events)

BPMN Loops and Iterations

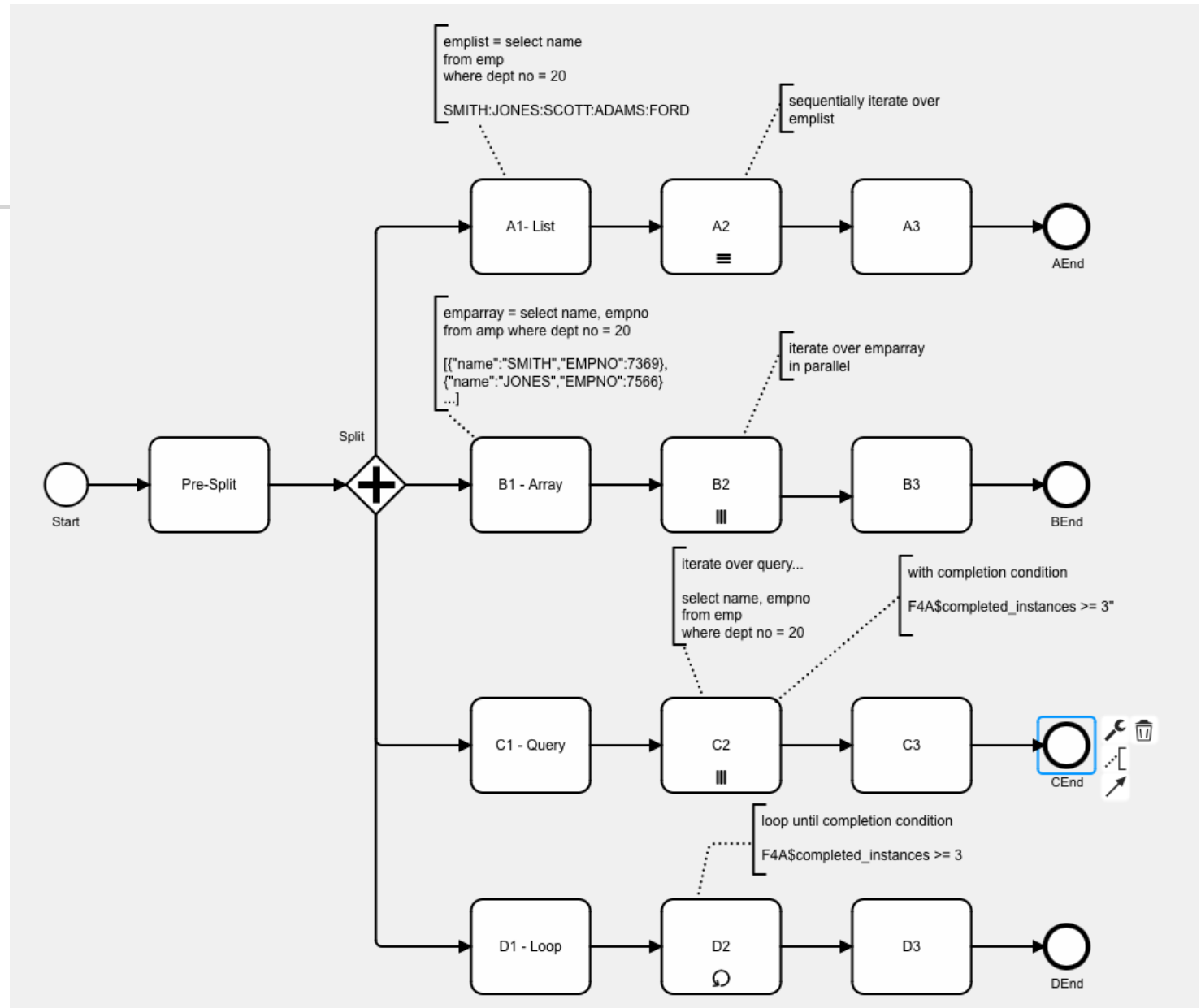
Iterations: Perform Task for each item in a list

- Sequentially or In Parallel
- List, JSON Array, or SQL Query
- Optional Completion Condition

Loops: Repeat task until meeting Completion Condition

For all Task types and SubProcesses

Flow Viewer visualization support to see status of all iterations of tasks and sub-processes



Iterations Use Case: Consulting Timesheet



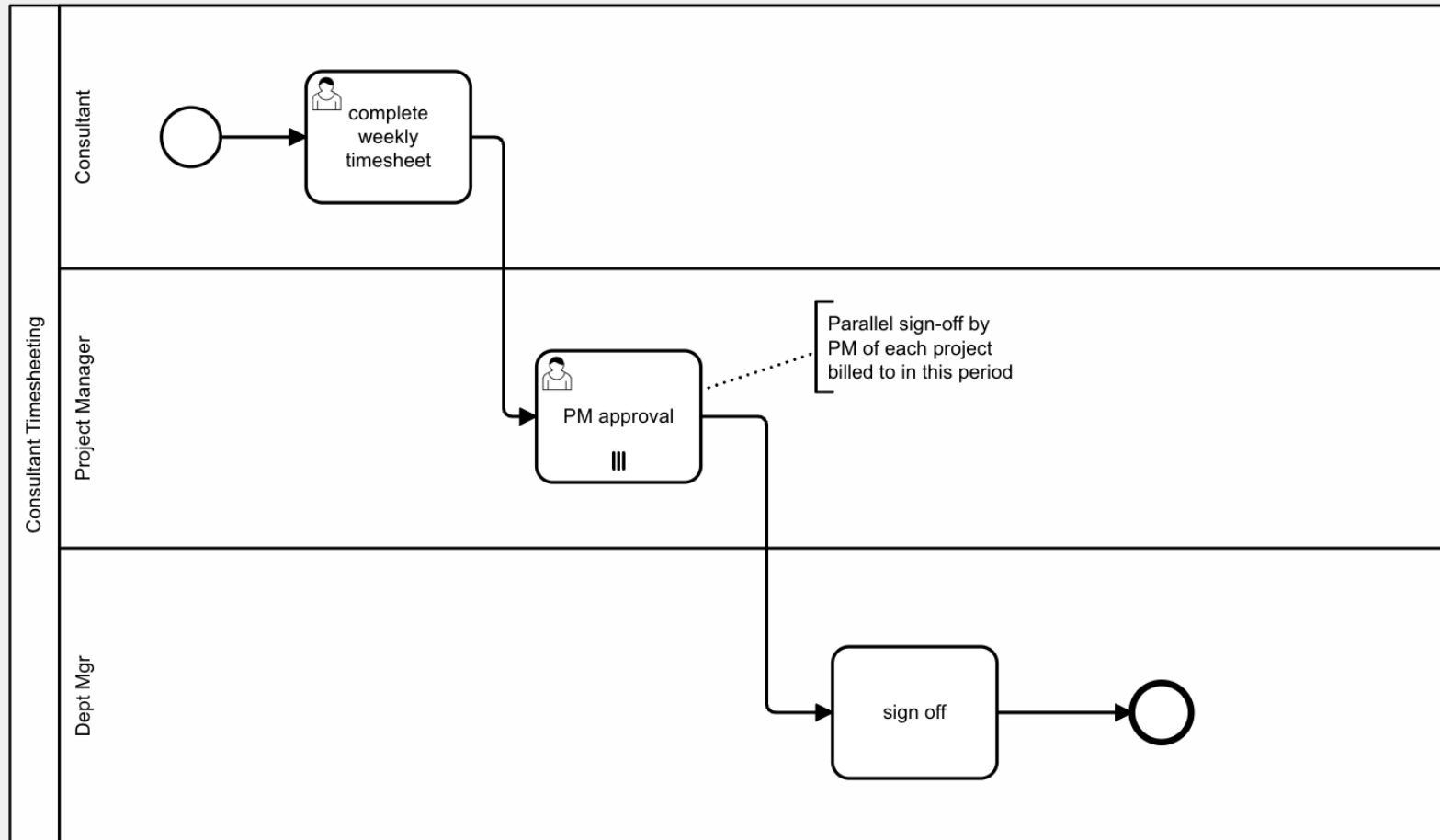
Each consultant can work on one or more projects during the week.

At the end of the week, they submit a timesheet showing how many hours they bill to each project they worked on.

The Project Manager must approve any billing to their project.

Once all the Project Managers have approved, the line manager signs off the timesheet.

Use Case: Consulting Timesheet



GenAI Support for BPMN Modeler



The screenshot displays a BPMN Modeler interface with a chat window titled "Flo, the Flows for APEX AI advisor". The chat window contains a detailed summary of a BPMN diagram named "A25f - Sequential Iterations with SubProcesses". The summary includes a description of the process, a numbered list of steps, and details for two specific paths (Path A and Path B). The chat window also features a text input field at the bottom labeled "Type your message here".

Flo, the Flows for APEX AI advisor

This BPMN diagram illustrates a business process named "A25f - Sequential Iterations with SubProcesses" that handles multiple operations on employee data, specifically for employees in department 20. The process comprises several sequential and parallel subprocesses, each operating on different data structures (lists, arrays, direct queries). Here's a summarization of the process:

- 1. Start Event:** The process begins with the "Start" event.
- 2. Pre-Split Task:** A preliminary task called "Pre-Split" is performed before branching into multiple paths.
- 3. Parallel Gateway - Split:** The process splits into four parallel paths (A, B, C, D) for handling different kinds of iterations over employee data.

Path A: Processing List of Employee Names

- 4. A1 - List:** Executes a SQL query to list employee names where department number is 20 (EmpList).
- 5. A2 (Subprocess):** Sequentially iterates over the list of employee names:
 - A2 Start:** Begins the iteration.
 - A2a to A2b:** Executes tasks on each employee name.
 - A2 End:** Ends the iteration.
- 6. A3:** Performs an additional task following the iteration.
- 7. AEnd:** Concludes Path A.

Path B: Processing Employee Name and Number Array

- 8. B1 - Array:** Executes a SQL query to fetch an array with employee names and numbers where department number is 20 (EmpArray).
- 9. B2 (Subprocess):** Iterates over the array:

Type your message here

```
emparray = select name, empno
from emp where dept no = 20
[{"name":"SMITH","EMPNO":7369},
{"name":"JONES","EMPNO":7566}
...]
```

iterate over emparray

AEnd

Use of BPMN allows today's LLMs to assist the business modeler in use cases:

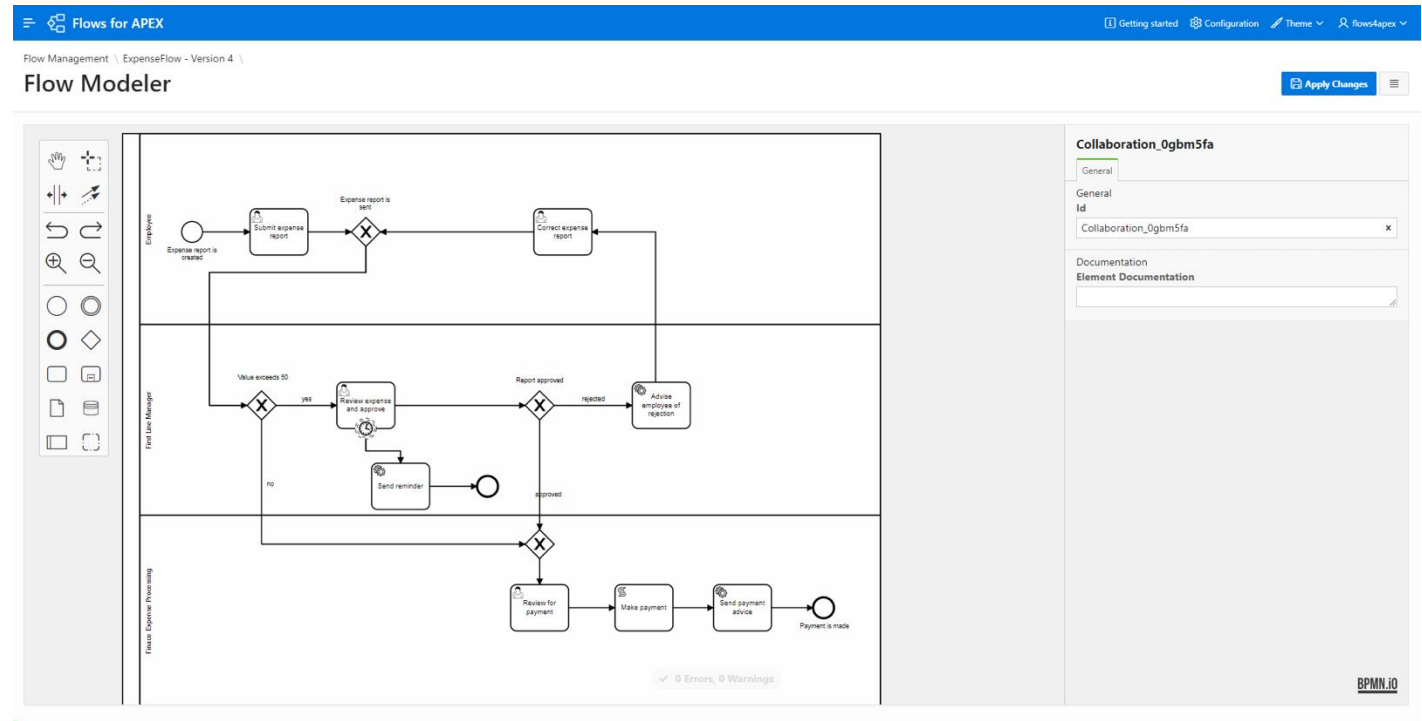
- Model summarization
- Error detection and explanation
- Improvement suggestions
- Translation

Other use cases will follow, including in-process AI support and model generation

Process Variable System

Process instances need to keep variables and process state for the duration of the process

- **typed** (varchar2, number, date, timestamp with time zone, clob, json)
- **set/get** using API or APEX Plugins
- **scoped** – to avoid conflicts on call activities and iterations



Variable Expressions

Each step in a process can evaluate SQL / PL/SQL expressions to set process variables

- 'Triggers' that fire before and after each process step
- Used to dynamically control process flow, assignment, execution based on database data.

The screenshot displays the Oracle APEX process editor interface. On the left, a vertical toolbar contains icons for various process elements: a hand (start), a plus sign (add), a double vertical line (assignment), an arrow (flow), a curved arrow (loop), a magnifying glass (search), a circle (event), a diamond (decision), and a square (end). The central workspace shows a process flow starting with a circle, leading to a rectangular task box labeled 'Enter Order' with a person icon. To the right of the task box is a palette of icons for different task types. On the right side, the configuration panel for the 'Enter Order' task is open. The panel has a header 'USER TASK Enter Order' and several expandable sections: 'General', 'Documentation', 'Task Type', 'APEX Page', and 'Variable Expressions'. The 'Variable Expressions' section is expanded, showing a list of expressions. The first expression is '0 - CustomerPromise', which is expanded to show its configuration. The configuration includes: 'Sequence' set to '0', 'Name' set to 'CustomerPromise', 'Data Type' set to 'Timestamp with Time Zone', 'Expression Type' set to 'Process Variable', and an 'Expression' text area containing the SQL query: `select promise
from orders
where id = :F4A$BUSINESS_REF`. Below the text area is a label 'Name of the Process Variable'.

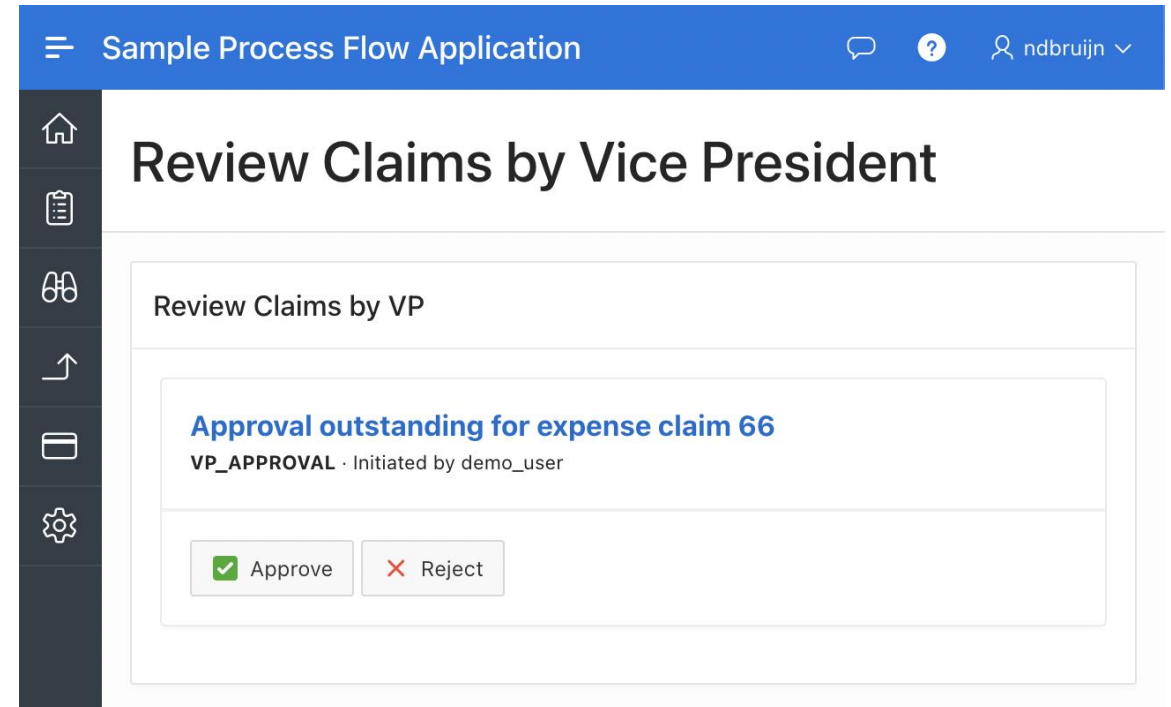
Integration with APEX Workflow and APEX Human Tasks

APEX Human Tasks (Approval & Action Tasks)

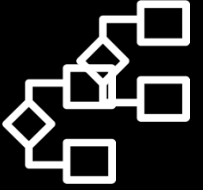
- A user task can be implemented as an APEX Approval Task for an approval as part of a wider BPMN process
- In your custom app, you can use a new process plug-in "Return to Flows for APEX", no coding required for the integration
- Flows for APEX tasks can be shown inside the APEX Unified Task List with minor configuration

APEX Workflow (from APEX 23.2)

- Goal: Flows for APEX workflows should be able to start & be started by APEX Workflow, and vice-versa.
- Flows for APEX will continue to be a good option for customers with BPMN requirements / investment.



Flows for APEX or APEX Workflow?



Process Automation Options in Oracle APEX 23.2 and Beyond

March 5, 2024 | 10 minute read



Ralf Mueller
Architect

Overview

According to Gartner, "Business Process Automation (BPA) is defined as the automation of complex business processes and functions beyond conventional data manipulation and record-keeping activities, usually through the use of advanced technologies. It focuses on 'run the business' as opposed to 'count the business' types of automation efforts and often deals with event-driven, mission-critical, core processes. BPA usually supports an enterprise's knowledge workers in satisfying the needs of its many constituencies."

Business Process Automation technologies are typically used for the core and mission critical business processes within a company and include Order-to-Cash, Procure-to-Pay, Patient admission and discharge and many more. As a result, BPA has become an important aspect of any Low-Code Application Platform (LCAP) and most vendors in the LCAP space are also offering Process Automation solutions, typically fully embedded and integrated within the LCAP itself.

Currently, there exist two Process Automation solutions

1. **Oracle APEX Workflow (introduced in 23.2)**
2. **Flows for APEX (since 2020)**

The blog will provide a brief overview of both Process Automation solutions and is intended as a guide for developers and customers on when to use which solution.

Executive Summary

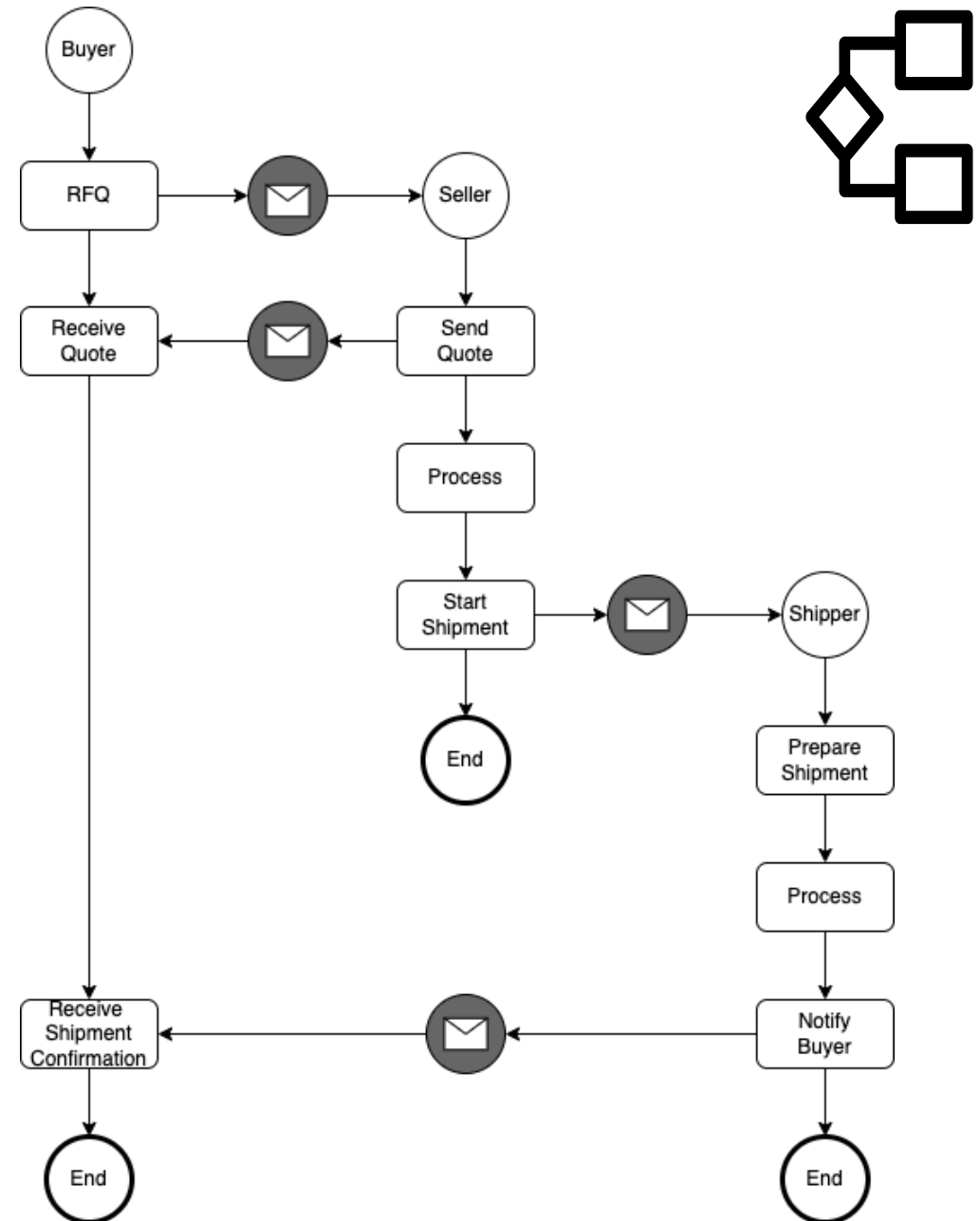
<https://blogs.oracle.com/apex>

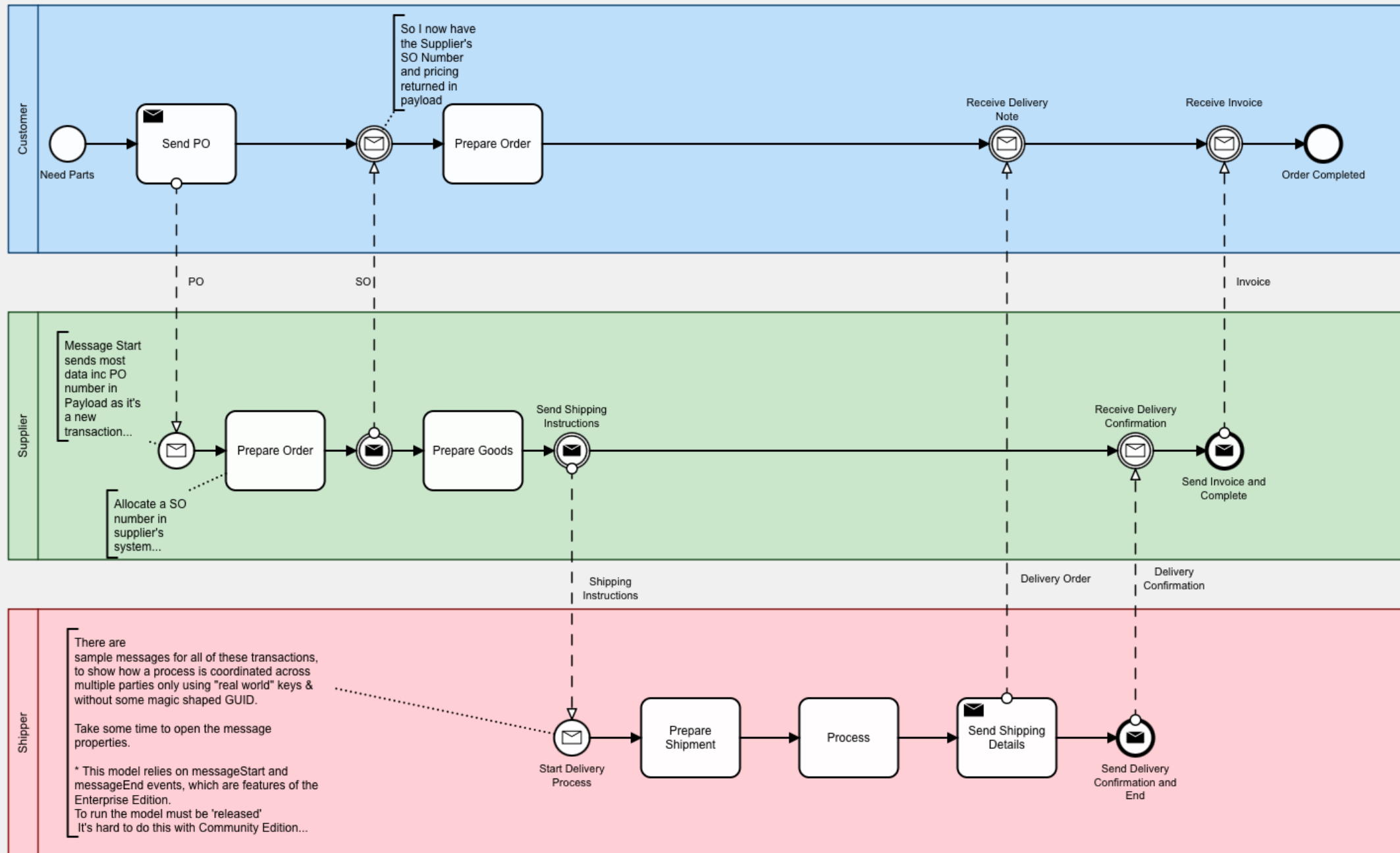
Inter Process Collaboration – BPMN MessageFlow

Allow workflows to collaborate by exchanging formatted messages.

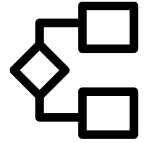
Message correlation is based on business data, not a GUID or workflow IDs.

- Catching Events subscribe and wait for an incoming message
 - Start Event, Intermediate Event, Boundary Event
- Throwing Events emit a message
 - Intermediate and End Events





Logging



Capture, Archive, Purge



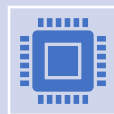
Granular Logging for management, debugging, and audit



Instance Archive – a JSON summary of all instance events for an instance created after process completion.



Logging data purged after retention period



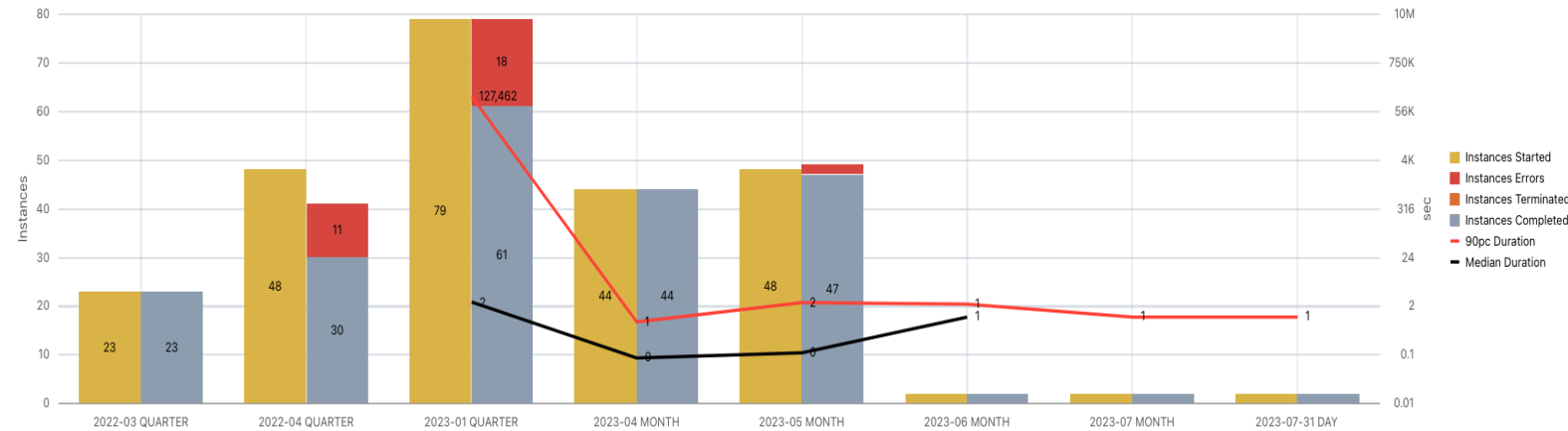
Design intention to create multi-year forensic archive capability using Instance Archives and Diagram Archives stored in OCI Object Store.

Process Statistics

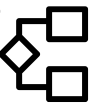
Capture, Summarize, Purge

- What is my process performance compared to last week /month / year?
- Where are the bottlenecks in my processes?
- Where do I prioritize automation or process redesign?

Process Performance (Period Summaries)



Generates daily summary statistics for each process type and process step type, with frequency, active time and wait time
Aggregates into month-to-date, monthly, and quarterly summaries.
Used for Dashboard and drill-down process statistics

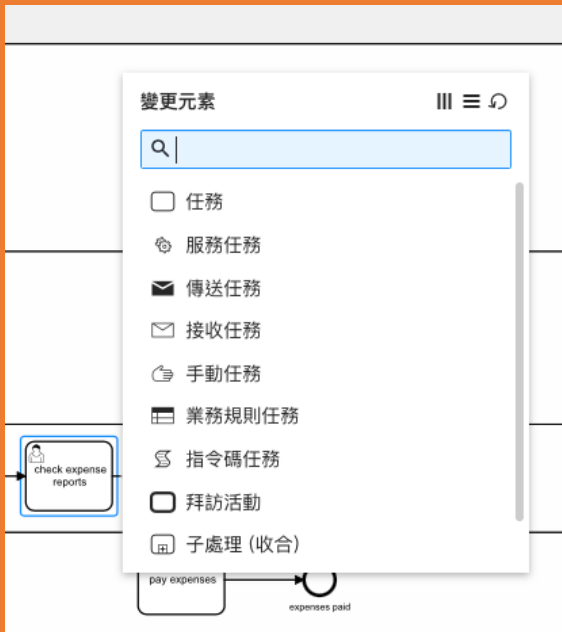


Beta / Lab Feature that we will enhance over future releases
Please turn on Statistics and start capturing data...

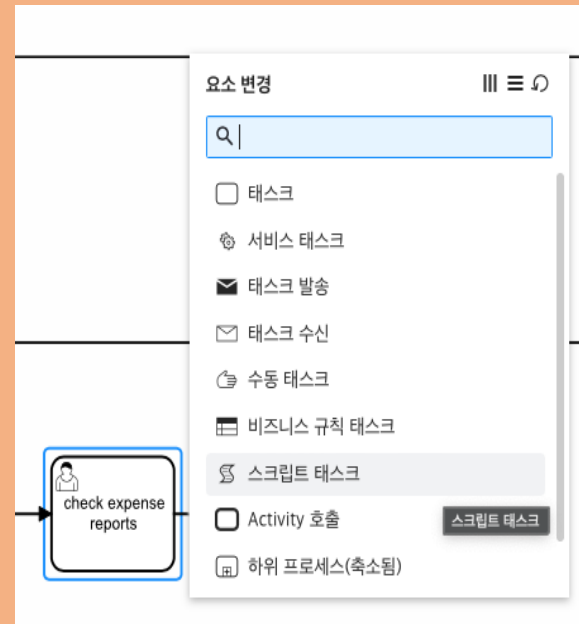
Language Availability



Now supporting all 10 APEX Developer Languages:



CHINESE



KOREAN

Supported Languages:

- English
- French
- German
- Spanish
- Italian
- Portuguese
- Japanese
- Korean
- Simplified Chinese
- Traditional Chinese

Thank you to our Translation Volunteers!

Agenda



01

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What's New

Flows for APEX Editions

Community Edition

Remains Open Source

MIT License from Hyand

Some new features

Community Support via Github

Issues

Remains Free

Enterprise Edition

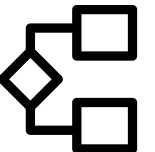
Adds Advanced Features to
Community Edition

Software support from Flowquest

Exciting development agenda

Commercial license from
Flowquest

Annual subscription basis



Flows for APEX v24.1 - Editions



Community Edition

- JSON-typed Process Variables
- BPMN Color support
- UserTask with APEX Simple Form
- Simple Process Starter

Community Support

MIT Licence
Download from flowsforapex.org

Enterprise Edition

All Community Edition features plus:

- Process collaboration / BPMN MessageFlow
- Task and SubProcess Iteration and Loops
- GenAI assistance for Modeler

Product Support and Helpdesk

Commercial Licence from Flowquest –
info@Flowquest.net

Flows For APEX v25.1 (target mid-year 2025)



Community Edition

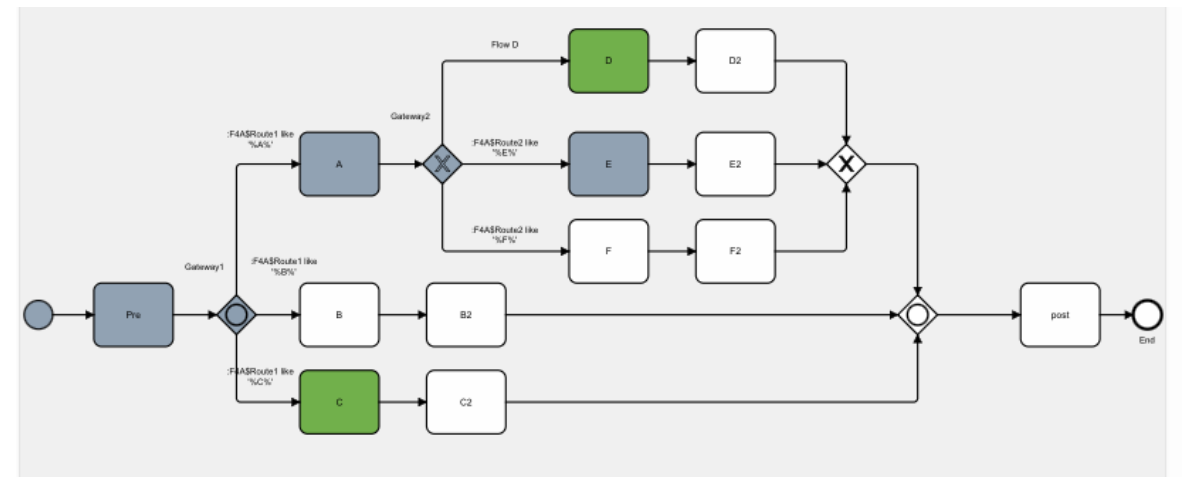
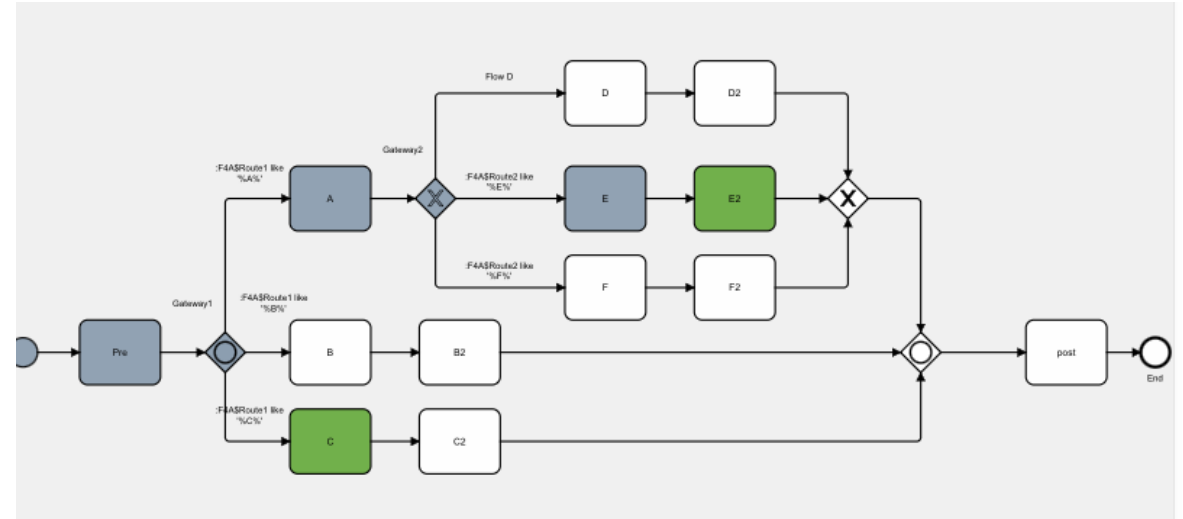
- Enhanced Event-based task logging and debugging
- Enhancements to APEX Human Task and Workflow integration
- Enhanced Flow Viewer as web component, with badging
- Usability and productivity enhancements

Enterprise Edition

- Process Suspend, Rewind and Resume for admin of “bad” processes.
(BPMN can be rewound!)
- MessageFlow architecture improvements (inbound message queueing, outbound endpoint specification)

BPMN models how your business process should work...
... but sometimes things go wrong, users make bad choices, bad data causes the wrong path....

- Suspend and Resume
- Return to previous Step
- Return to Previous Gateway
- Rewind from SubProcess
- Rewind from Call Activity
- Force next step on error
- Restart step on error
- Hold incoming Messages
- Suspend Timers



More Info



Web:

- www.flowsforapex.org
- www.Flowquest.net

Contains feature list,
documentation, tutorials, blog,
video resources

More Info:

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Enhancing Workflow in APEX with Flows for APEX: Introduction and

Please fill in your
evaluations