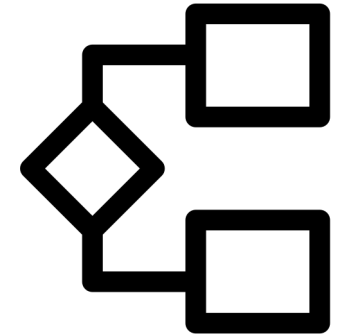


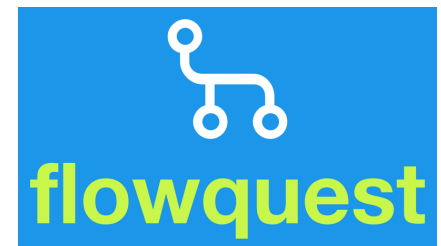
How hard can it be to get something approved?



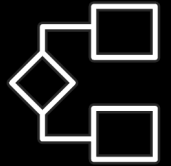
Approval Workflows ...from Simple to Complex

Richard Allen

27 March 2026



Richard Allen – About Me



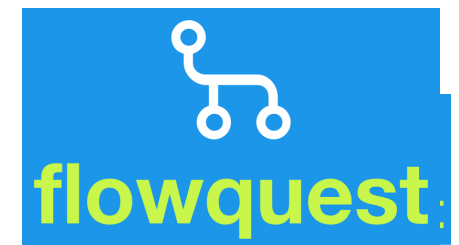
Richard@Flowquest.net

40-year Oracle User (RDBMS v4.1.4 (1985))

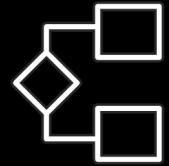
Ex-Oracle (twice!)

Developing Flows for APEX since 2020

2024 - Established Flowquest to further develop Flows for APEX and support our enterprise users.



About Flows 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

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

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

Process Large Export Order (Level: 0)

BPMN-based business process modeling and workflow engine for APEX.

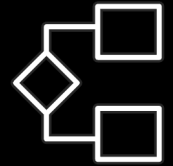
- Community Edition – free, open source
- Enterprise Edition – supported, additional functionality, licenced.

Some User Cases:

- Bank Loan origination – 1000 branches, 15k users, 10k processes / day, 3M first 18 months.
- Oracle OCI SaaS provisioning
- UK MoD - HR process extensions to Fusion HCM
- Tokyo Stock Exchange / NRI – AML/NYC



Building Declarative Autonomous Agents



Extending sequential workflow to adhoc tasks where a knowledge worker has discretion.

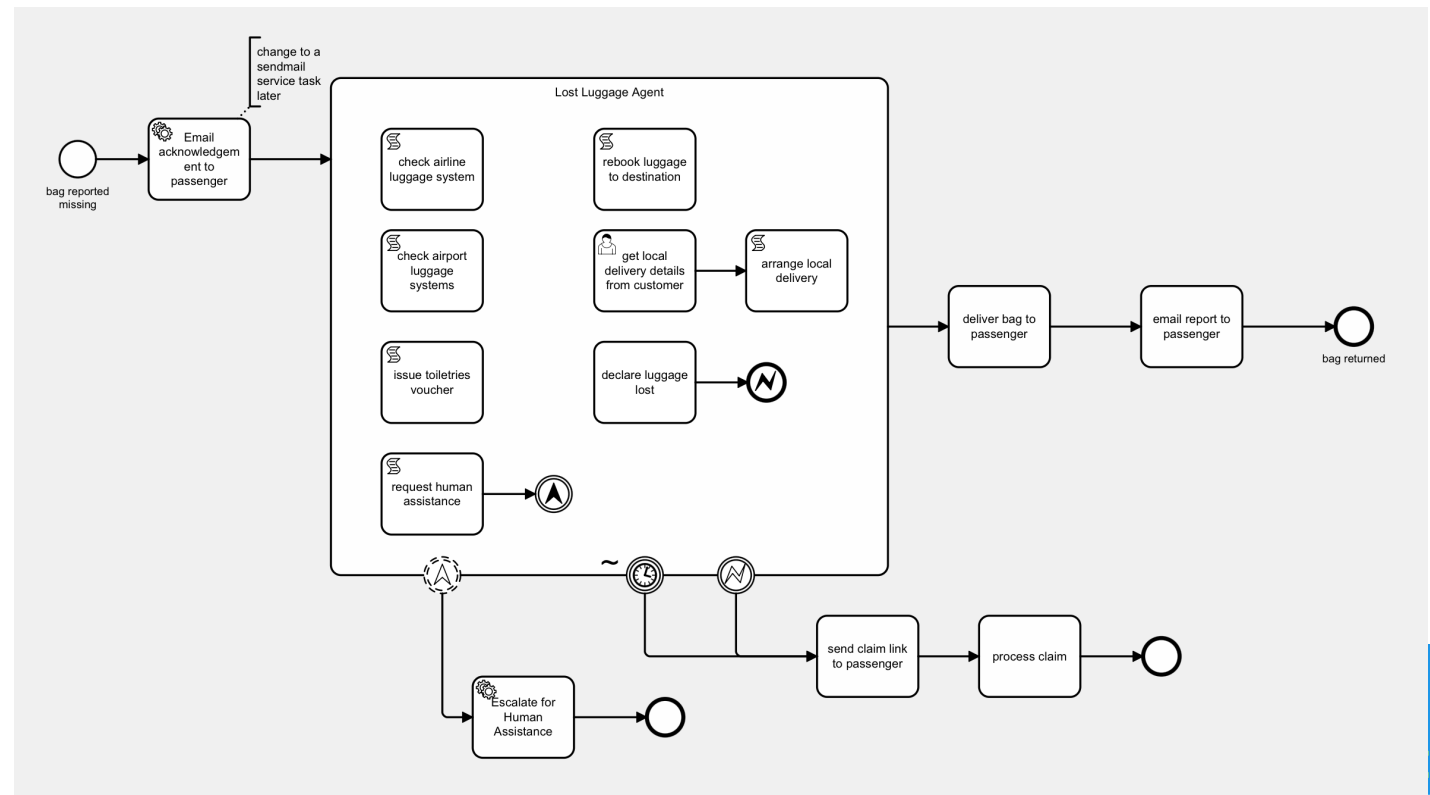
Agent and BPMN activities are all defined declaratively.

- Uses BPMN Adhoc Sub Process, allowing activities to be run as required

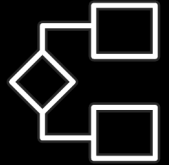
Agent can be manually or AI controlled – allowing you to create fully autonomous agents in APEX.

Puts BPMN guardrails around agentic workflow.

Coming Soon in F4A EE V26.1...



Motivation



50-80% of business workflows include approvals in some form

1) Primarily approval

- procurement approvals
- financial approvals
- HR approvals

2) Include Approval Steps

- HR on/off boarding
- contract approval,
- compliance

Why approvals dominate so heavily

1) Control & compliance

Financial governance
Segregation of duties
Audit trails

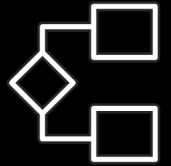
2) Risk management

Prevent unauthorized decisions
Ensure oversight

3) Organizational hierarchy

Decisions are delegated upward

Topics



Simple Approvals using APEX Human Tasks

‘Task Services’

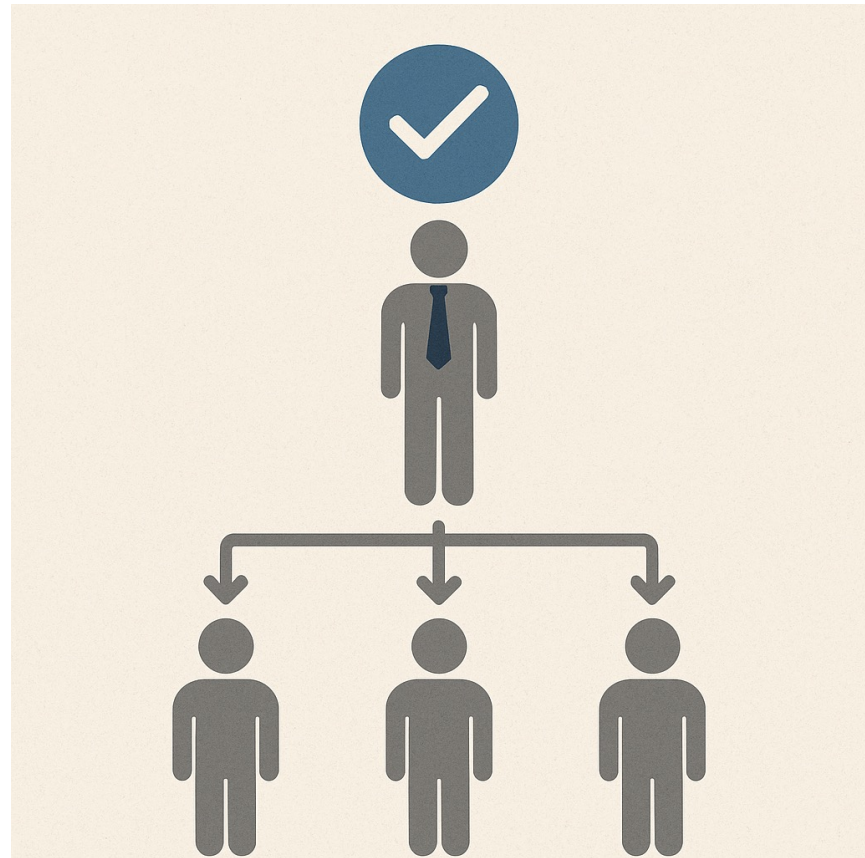
Task Assignment, Priority, Expiration

Multi-Approval Scenarios using Workflows

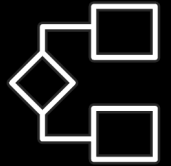
Sequential, Parallel, ...

All to Approve, ‘Any N’ to approve, Voting, etc.

Approvals and AI Agents



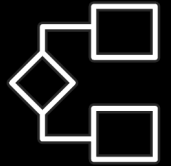
APEX Human Task – Approval Tasks



- APEX introduced the Approval Task in APEX 22.1
 - Added Action Tasks in 23.2.
 - Collectively APEX Human Tasks.
- APEX Approval Task can be used independently, or as part of a more complex workflow controlled by a workflow manager – such as APEX Workflow (from APEX 23.2) or from Flows for APEX.

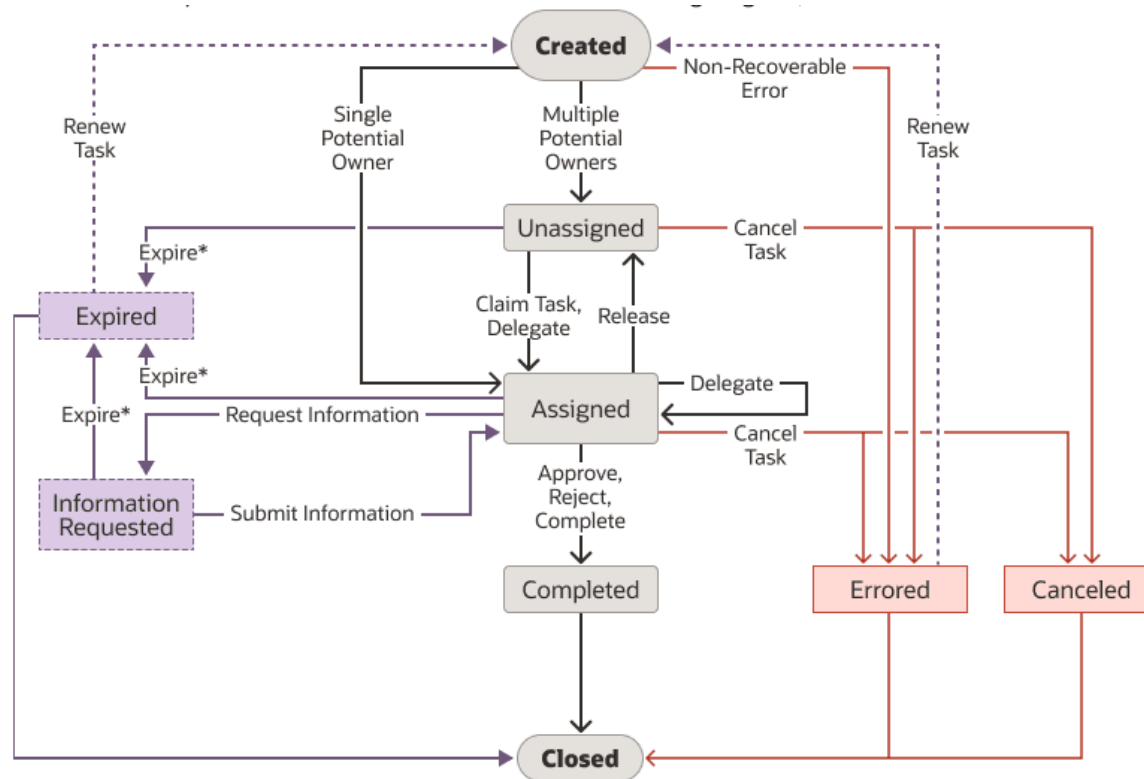
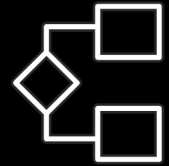


demo



- APEX Approval Task
- Task Detail Page
- Task List

APEX Human Task – State Model



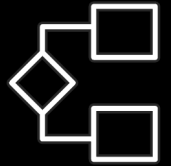
Legend:

- Typical Task Flow:
- Expiry & Request Info. Process:
- Exceptions to Typical Task Flow:

*Expired by background job ORACLE_APEX_TASKS_EXPIRE



Other Properties of APEX Human Tasks



Subject

Task Assignment and Ownership

- Potential and Actual Owners

- Business Administrators

Priority

Task Expiration

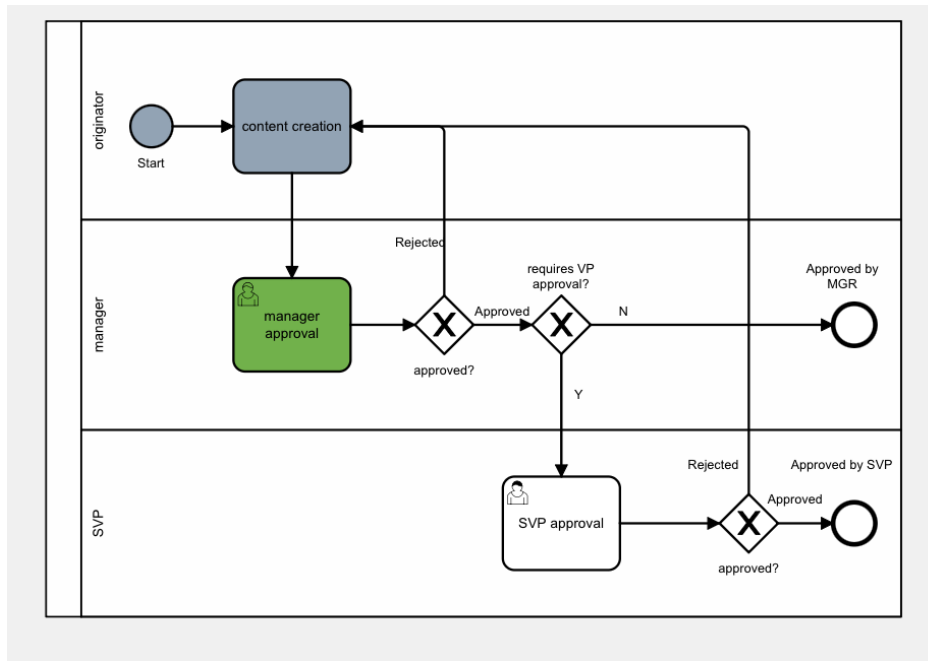
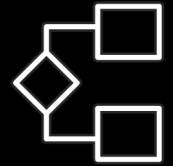
Comments

- Refer for more information

- Comment History



Sequential – Driven by Workflow Manager

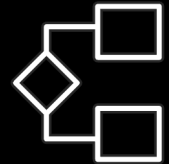


As workflow rules get more complex, and includes more than just 1-2 approvals, move to a workflow manager

Choice of:

- Native APEX Workflow
- Flows for APEX (BPMN based)

APEX Human Task – Task Assignment



APEX Task Potential Owners and Business Admins can be assigned from Flows for APEX.

- APEX Task calls back to Flows to get the Potential Owners and Business Admins during task creation.
- Business Admin can be specified as a setting on the BPMN user task, with optional diagram level default and a system-wide config parameter
- Group assignment removed until supported by APEX Human Tasks.

Task Definition: A24d - Simple Action Task

Cancel Delete **Apply Changes**

Show All Name Settings Deadline Participants Parameters Actions Comments Last Updated

Due On Type: None

Participants

Vacation Rule Procedure: [input field]

Search: All Text Columns Go Edit Add Row Reset

Participant Type	Value Type	Value
Potential Owner	Expression	flow_api_pkg.get_task_potential_owners(p_process_id => :PROCESS_ID, p_subflow_id => :SUBFLOW_ID, p_step_key => :STEP_KEY)
Business Administrator	Expression	flow_api_pkg.get_task_business_admins(p_process_id => :PROCESS_ID, p_subflow_id => :SUBFLOW_ID, p_step_key => :STEP_KEY)

Total 2

Parameters

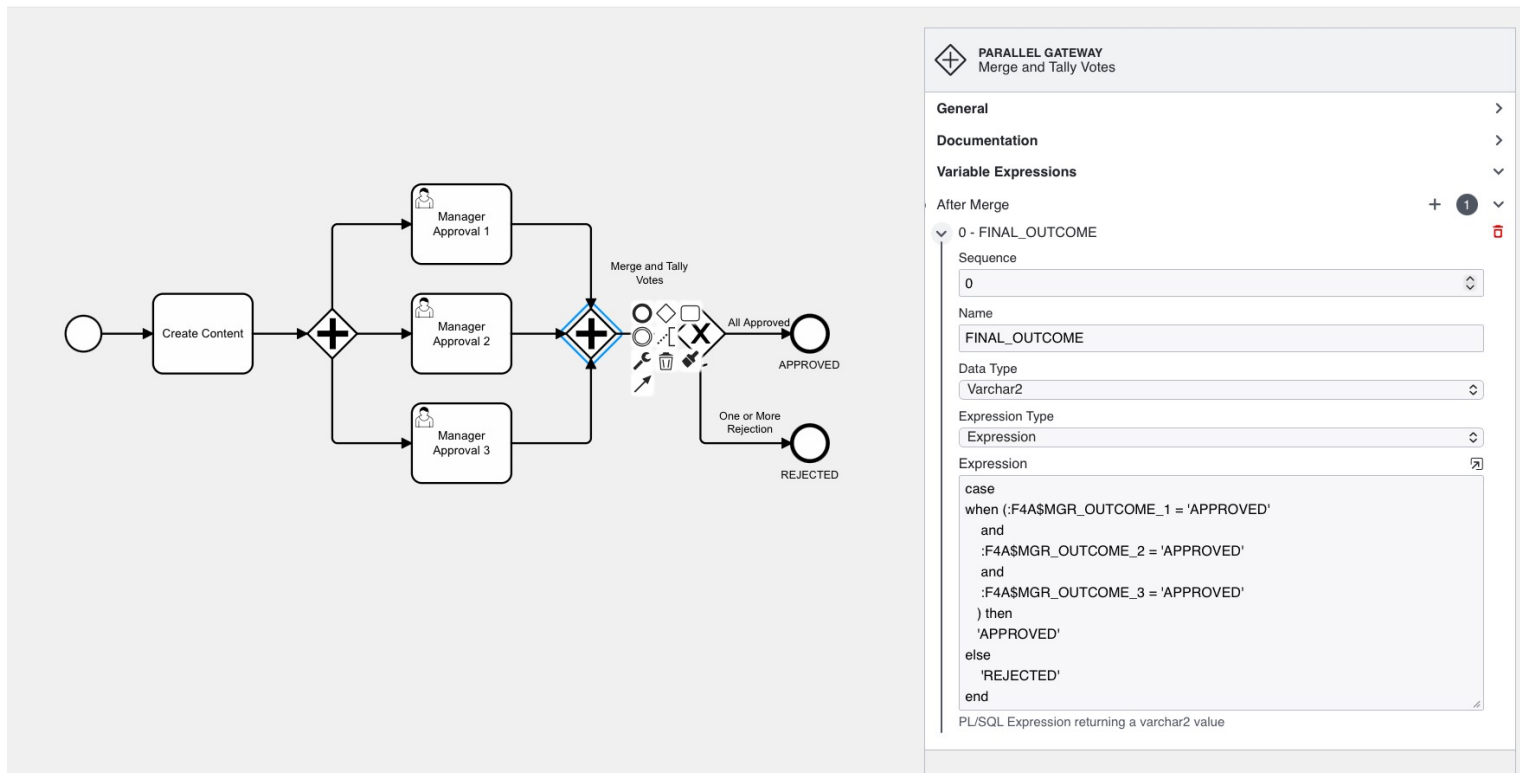
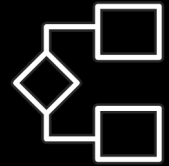
Search: All Text Columns Go Actions Edit Add Row Reset

Static ID	Label	Data Type	Required	Visible	Updatable	Comment
PROCESS_ID	Process Id	String	Yes	Yes	No	Flows for APEX Process ID
STEP_KEY	Step Key	String	Yes	Yes	No	Flows for APEX Step Key
SUBFLOW_ID	Subflow ID	String	Yes	Yes	No	Flows for APEX Subflow ID

Total 3



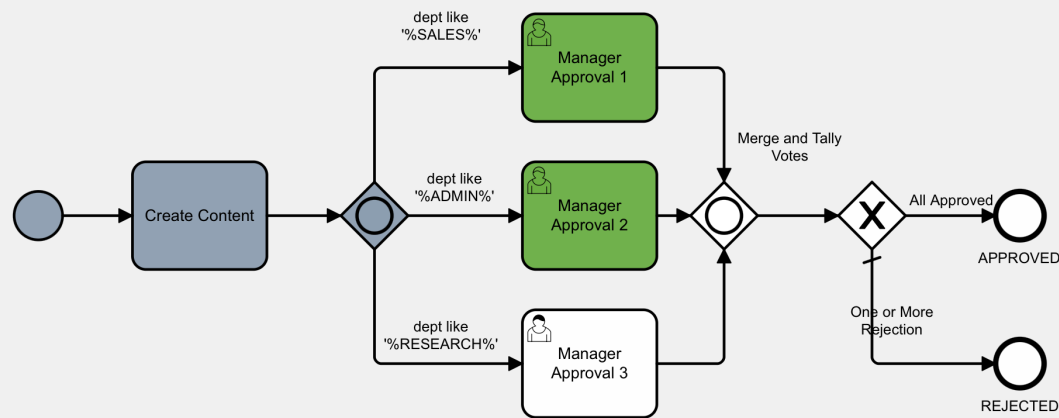
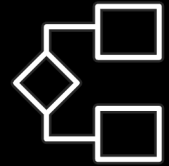
Parallel Approval



- Managers approve in parallel
- Combine results in Merging Gateway expression.

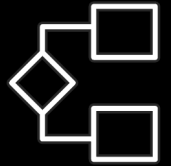


Conditional Parallel



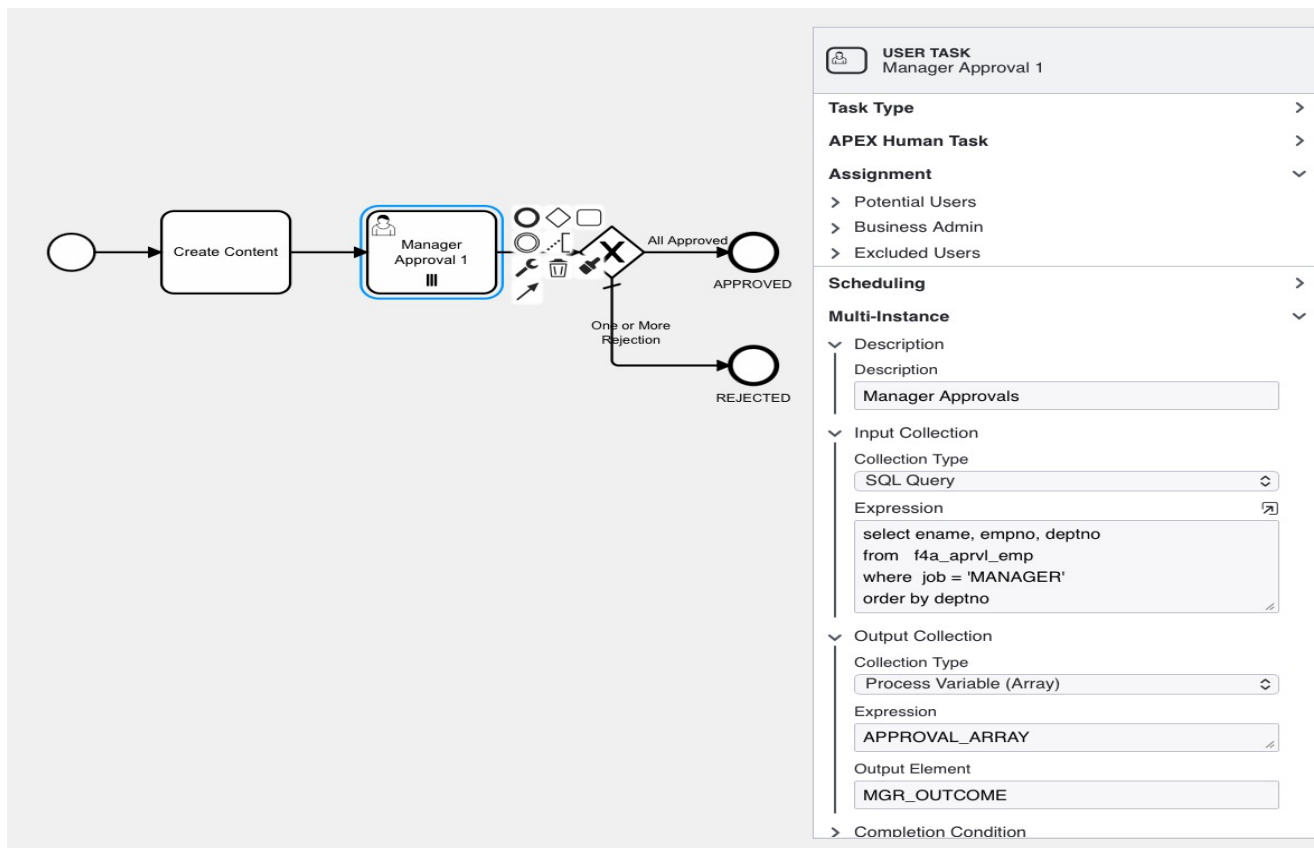
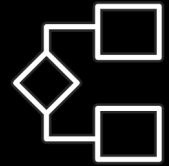
Uses a Conditional Parallel (inclusive) gateway instead of Parallel Gateway

Parallel – All Managers?



But what if we don't know how many managers there are in advance?

Parallel – All Managers must approve



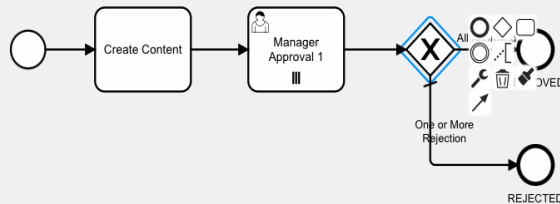
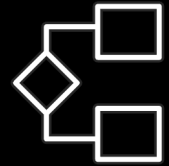
Multi-Instance parallel approval (for each member of set).

Creates a parallel approval task for every manager...

- Task assigned to 'ENAME'



Parallel – combining results...



EXCLUSIVE GATEWAY

Variable Expressions

FINAL_OUTCOME

Data Type: Varchar2

Expression Type: Function Body

Expression

```
declare
  l_json   json_element_t;
  l_array  json_array_t;
  l_item   json_object_t;
  l_mgr_outcome varchar2(50);
begin
  -- Get the JSON process variable as a JSON element
  l_json := flow_process_vars.get_var_json_element(
    pi_prccs_id => flow_globals.process_id,
    pi_var_name => 'APPROVAL_ARRAY');
  -- Cast to array
  l_array := treat(l_json as json_array_t);
  -- Loop through each item
  for i in 0 .. l_array.get_size - 1 loop
    l_item := treat(l_array.get(i) as json_object_t);
    -- Get MGR_OUTCOME from outputVariables
    l_mgr_outcome := upper(
      treat(l_item.get_object('outputVariables') as json_object_t).get_string('MGR_OUTCOME'));
    -- Check outcome
    if l_mgr_outcome != 'APPROVED' then
      return 'REJECTED';
    end if;
  end loop;
  return 'APPROVED';
end;
```

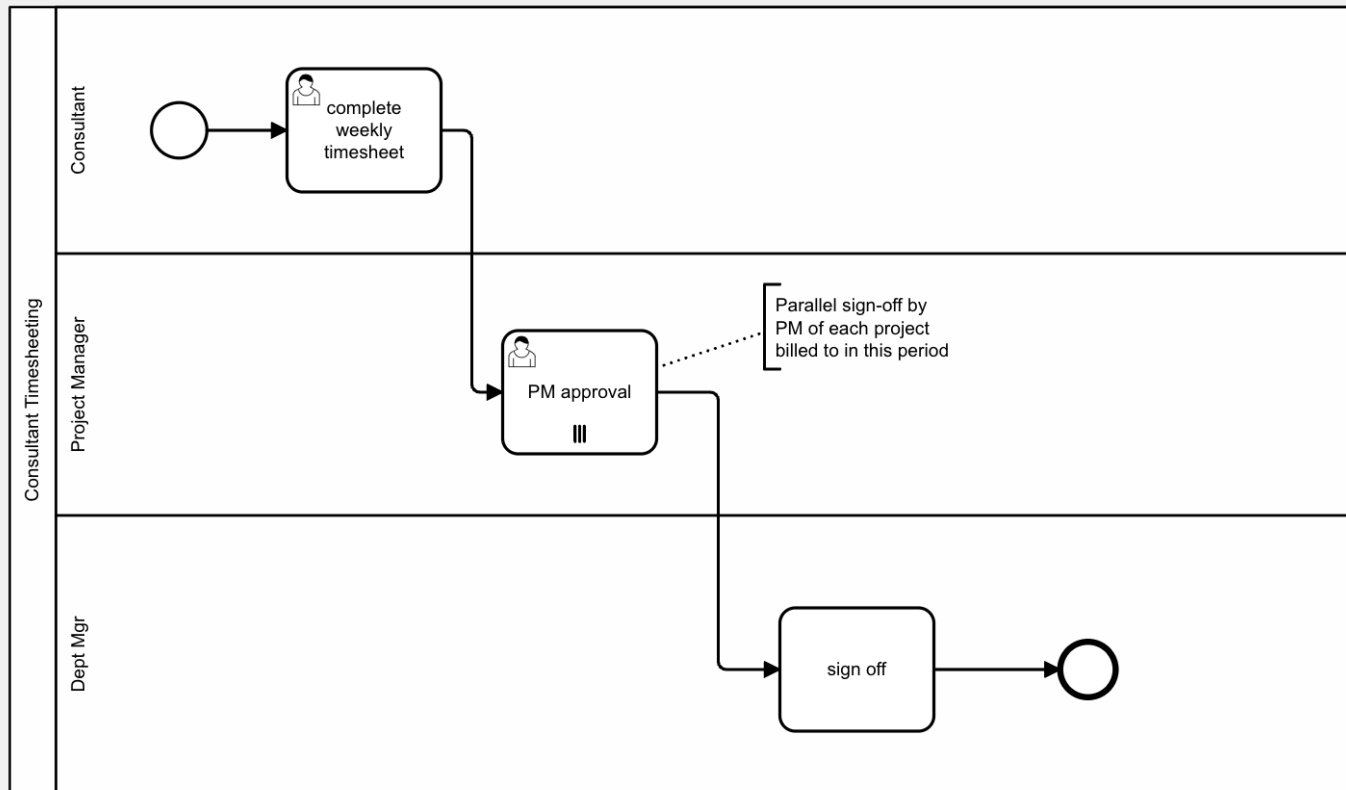
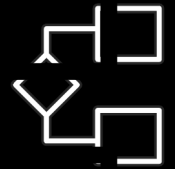
PL/SQL Function Body returning a varchar2 value

- Cleaner BPMN
- Handles unknown number of managers
- If combination PL/SQL is scary, use GPT!
- F4A 26.1 will have JSONpath variable expressions.

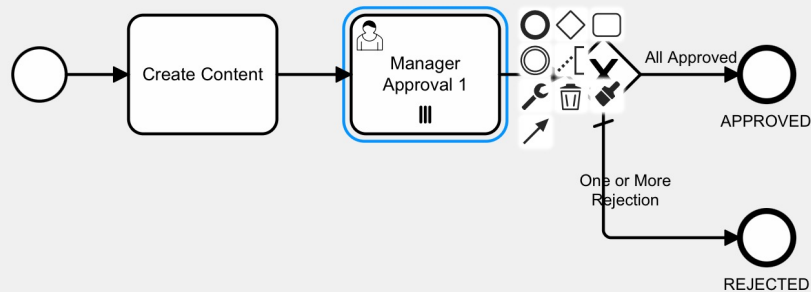
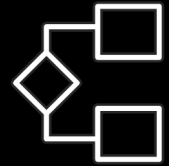
Note: Iterations (for each) requires Enterprise Edition.



Use Case: Consulting Timesheet



'Any 3 Managers'



USER TASK
Manager Approval 1

General >

Documentation >

Task Type >

APEX Human Task >

Assignment >

Scheduling >

Multi-Instance v

- > Description
- > Input Collection
- > Output Collection
- v **Completion Condition**

Condition Type
Expression

Condition
:F4A\$completed_instances
>= 3

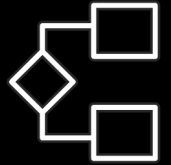
PL/SQL Expression returning a boolean value

Approach:

- Send to all managers in parallel (use parallel iteration / for each)
- Completion Condition when three approve



Voting



Use case:

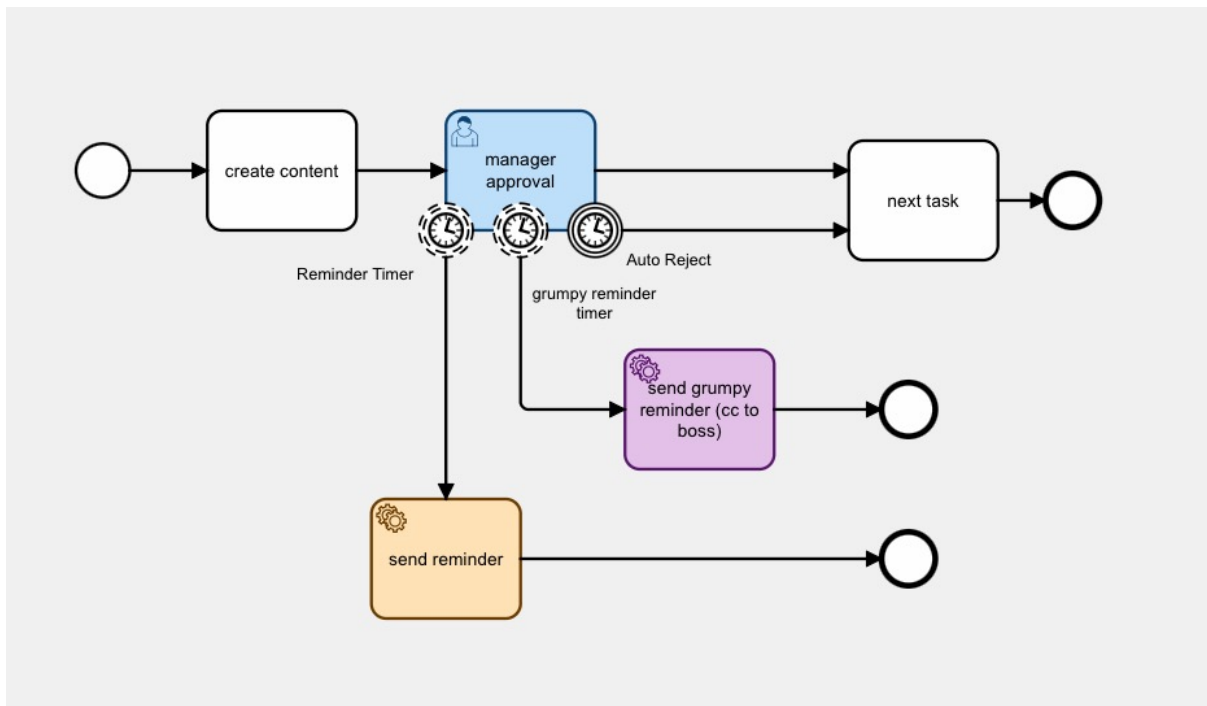
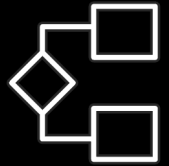
- Technical Committees
- Board of Directors
- Government

Approach:

- Send to all members in group in parallel (iteration 'for each')
- Count 'APPROVED' and 'REJECTED' after group completed
- Timer to End Voting Period?



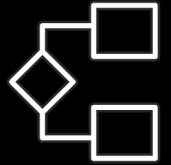
Reminders



BPMN timer boundary events can be used to send reminders

- email every day (repeating)
- grumpy email to boss after a week
- interrupting auto approval after 2 weeks...

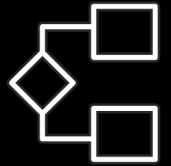
Expiration



Task Expiry has 3 options. At expiration :

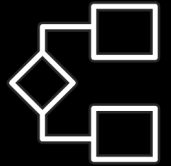
1. task becomes **overdue**.
2. task is **cancelled**.
3. task is cancelled and a new task **re-created**.
 - Staleness Bias
 - Re-assess Priority and Task assignment
 - Caution - ? Workflow Integration?

Delegation and Vacation Rules



Use APEX Vacation rules at
workspace and task level

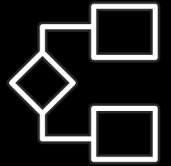
Task Assignment Corporate Style



- Ideally task assignment for approvals comes from your corporate approval matrix – rather than being built into individual apps.
- Use SQL and PL/SQL to query corporate HR / ERP / other systems to find who can approve your transaction
- Don't have a central authority matrix?
 - Help is coming – APEX 26.1 should contain a Business Rules Engine that can be used as an Authority Service



Example use of Rules Engine for Approval Matrix



Send to Rules Server:

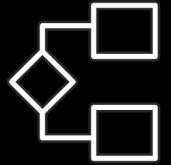
```
{  
  "amount": 125000,  
  "cost_center": "IT",  
  "region": "UK",  
  "request_type": "CAPEX"  
}
```

Receive back from Rules Server:

```
{  
  "approvers": ["managerA", "financeB"],  
  "levels": 2,  
  "policy_id": "CAPEX_UK_v3"  
}
```



More Info



Web:

- <https://flowsforapex.org/latest/complex-approvals>
- www.flowsforapex.org
- www.flowquest.net

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

More Info:

- Please contact me –
- richard@flowquest.net

Contact info on the Flowquest website.

