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turbotax



quickbooks



mint

Workflow Automation for Small & Mid-market Business using Camunda

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Agenda

Introduction

About Me
About Intuit

Workflow Landscape

Workflow Use cases @ Intuit
Small & Mid-Market business problems

Journey so far

Where are we?
Why Camunda?

Architecture

Intuit Workflow Automation Platform
Camunda Integration Pattern

Unique Challenges

Workflow as a Service
Collaboration with Camunda

Q&A!

About Me

Srivatsan Vijayaraghavan

- Senior Engineering Manager at Intuit. I have been with Intuit for close to an year.
- Overall, 14+ Years in the Software Industry in the domain of E-Commerce, Databases, Data Engineering and Cloud space.
- I currently manage and lead teams in QuickBooks Advanced, whose primary mission is to build Workflow Automation platform to solve small and mid market business needs.
- Prior to joining Intuit, I was an Engineering Manager at Amazon helping Amazon to set competitive prices for their product.

About Intuit

Powering Prosperity

Our Mission is powering prosperity around the world

We're the proud maker of QuickBooks, TurboTax, and Mint. We are a mission-driven, global financial platform company that gives everyone the opportunity to prosper.

QuickBooks is an accounting software geared mainly toward small and medium-sized businesses and provides on-premises accounting applications as well as cloud-based versions that accept business payments, manage and pay bills, and payroll functions.

QuickBooks Online Advanced is targeted for mid-market customers, and provides critical features powerful to automate business processes like Workflow Automation, Batch Transactions, Business Insights, etc.

Intuit's Workflow Landscape

Workflow Use cases @ Intuit

Small Business Processes

Workflows driven by unique needs of businesses served by Intuit

- Customers set up their own workflows - DIY
- Unique customization needs for same workflows.
- Workflow complexities abstracted.

Examples

Small Business processes around approvals, expense management etc.

Assisted Services by Intuit

Workflows related to assisted services provided by Intuit.

- Fixed workflows for various assisted services.
- Some part of workflows are customer facing.
- Different Internal & External views.

Examples

Tax filing expert engagement (TTLive), Bookkeeper service for QuickBooks (QBLive)

Intuit's Internal Processes

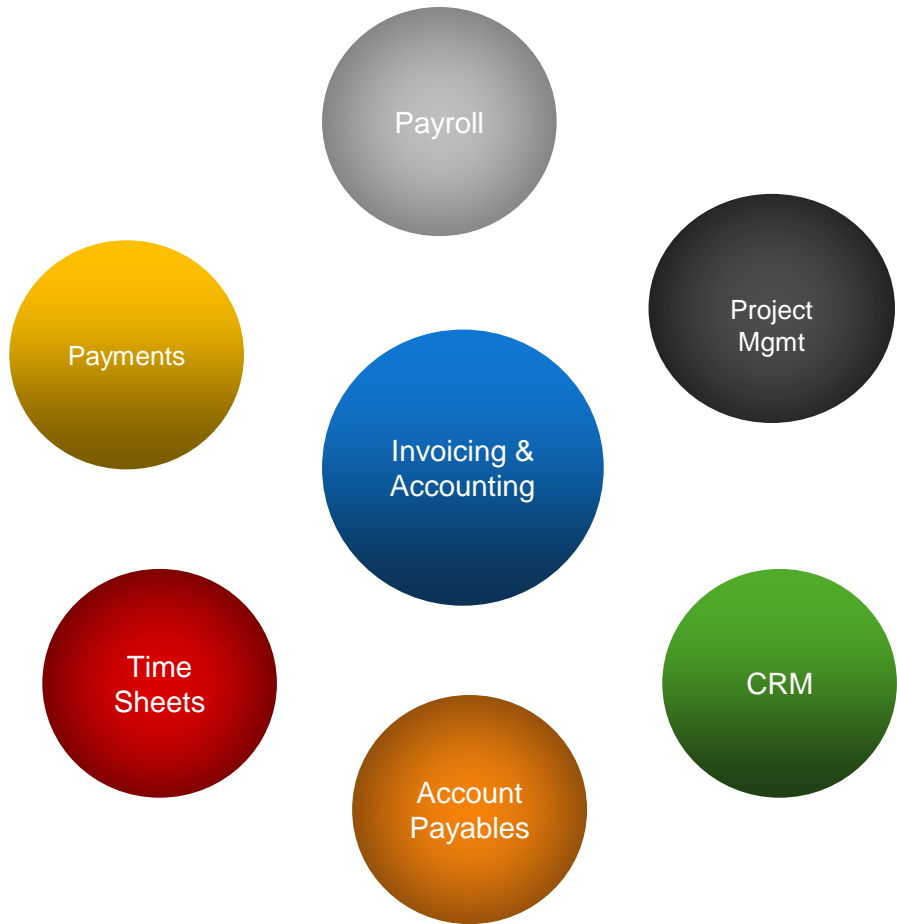
Workflows used internally for process automation.

- Back office processes in various Intuit products.
- Normally, not directly customer facing.
- Stronger admin controls

Examples

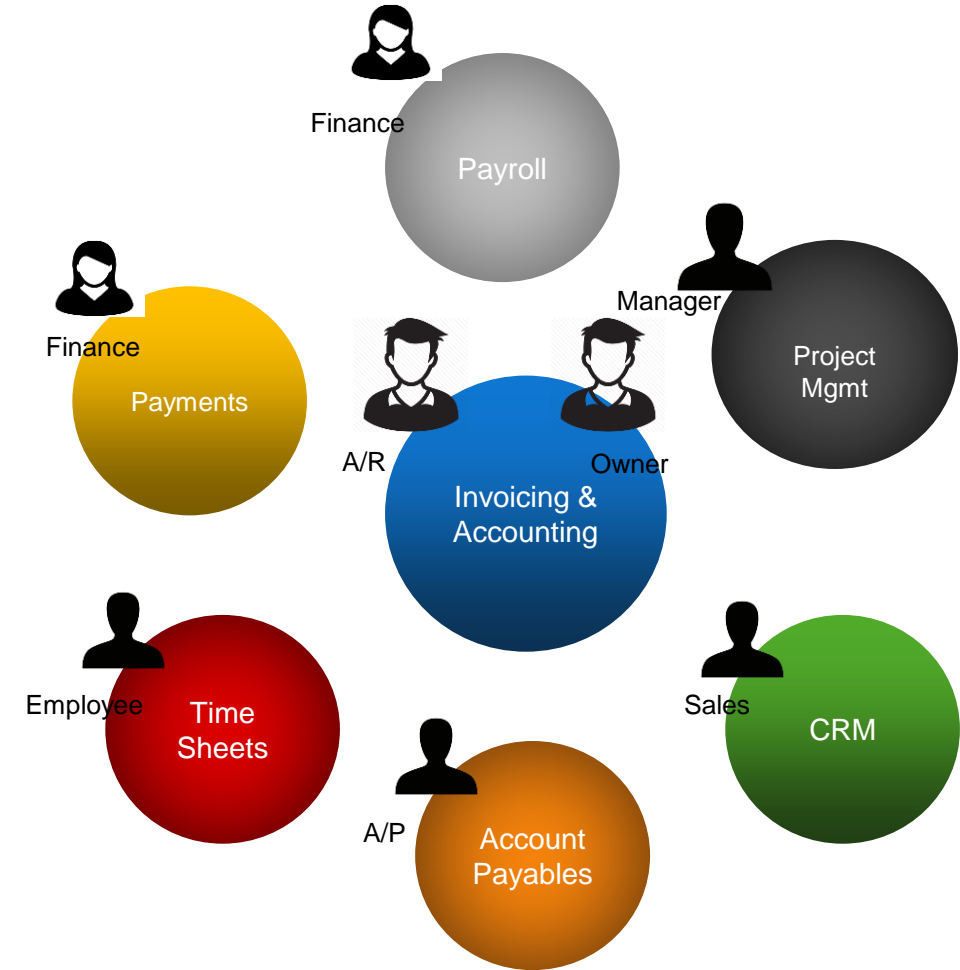
Merchant onboarding to Payment product, Business Loan processing for QuickBooks Capital Customers etc.

Small & Mid-Market Workflows



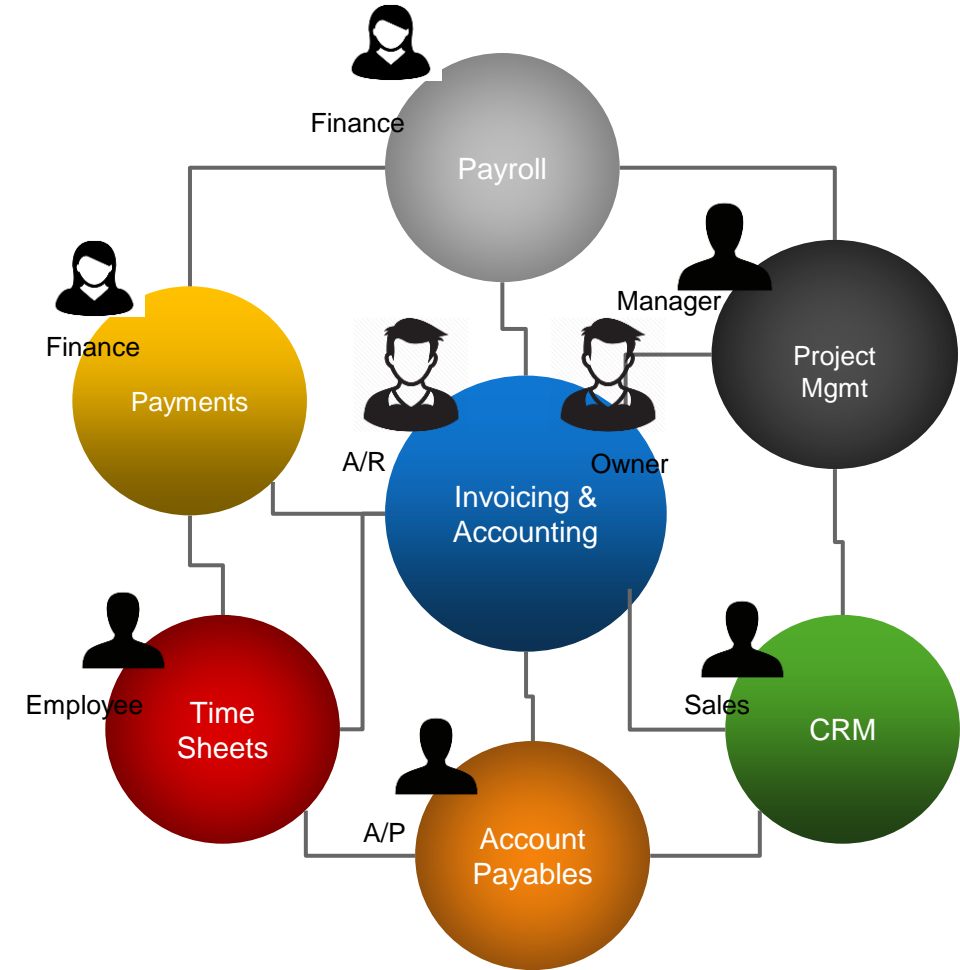
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Small & Mid-Market Workflows



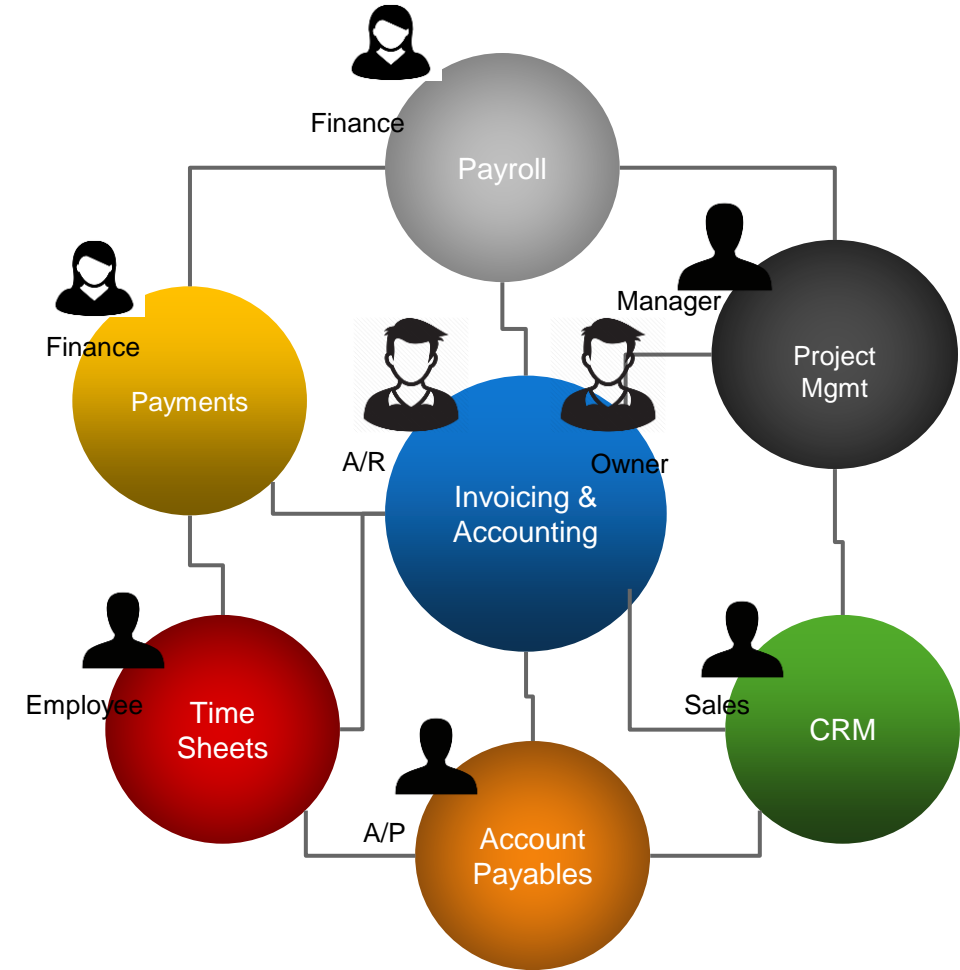
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Small & Mid-Market Workflows



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- Information & data captured in one system need to be synced into other systems.

Small & Mid-Market Workflows



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Business workflows needed by businesses mainly fall into 3 categories:

- Automated data sync between applications
- Organizational hierarchy-based workflows
- Reminders/Notifications & automated tasks

Small & Mid-Market Workflows



Approvals

Request and perform approvals

Examples

- Invoice approval based on the department before emailing to customer.
- Estimate approval by customer before invoicing.
- Define auto Approval or Rejection policy based on the elapsed time



Reminders & Notifications

Reminders & notifications for routine jobs

Examples

- Remind customers about overdue Invoice.
- Reminder self for paying bill on due date.
- Thank you note to customer on receiving the payment.



Task Management

Create, assign and manage tasks for users in the company

Examples

- Create new task and assign to specific user in the company.
- Automatic and scheduled reminders to complete the tasks.
- Auto tracking & closing tasks.

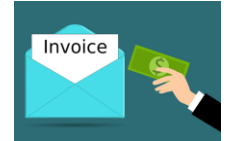


Data Review

Review, notifications and tasks for data coming in from other application

Examples

- Notifications on new data coming in through partner integrations
- Ability to review the data before accepting it into the books
- Writing back the data to external apps.



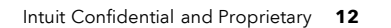
Automated updates

Setup auto updates to the books or transactions based on conditions.

Examples

- Automatically updating Invoice memo when Invoice becomes overdue.
- Converting a estimate to invoice once estimate is accepted by customer.

intuit.



Journey So Far

Workflow Automation Journey



01

Explore

- Understand the business use cases.
- Identify Capabilities
- Evaluating technology options.
- POCs and solution validation.
- Decision sign off



02

Unit Of One

- Prove architecture through unit of one.
- Building the foundational platform (Core functional capabilities, Hosting, Opex, Monitoring, FMEA)
- Learning from the feedback and making amends



03

Expand

- Broaden the functional capabilities to support all use cases.
- Scaling the platform for higher traffic and more offerings.
- Onboard more use cases
- Well defined Availability, HA/DR, FMEA strategy in place.



04

Mature

- Completed all functional capabilities.
- Easy & automated developer tooling for open contribution
- Mature process on opex, monitoring, alerts etc.
- Continuous improvements

Workflow Automation Journey



01

Explore



02

Unit Of One



03

Expand



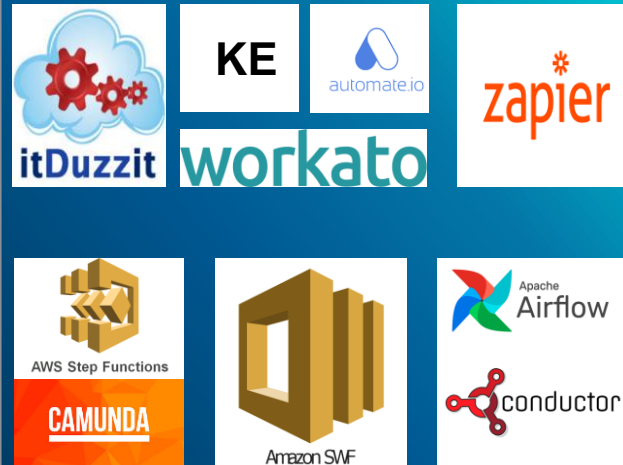
04

Mature

Key Capabilities

- Multi-stage, long running (waiting for human action).
- Connecting to apps
- Trigger/Action options through events, API, web-hooks)
- Rules evaluator/engine
- Scheduler & Timer
- Configurable and shareable by end-users
- Manual override

Solution Options



Camunda

- BPMN based (Standard)
- Supports all Capabilities
- Industry Leader
- Great support
- Scale
- Multiple Architecture options

Workflow Automation Journey



Invoice Approvals In QuickBooks Advanced

Approval Feature

- Role based approval
- Rules to select approver
- Approval Reminders
- Auto Approval/Rejection
- Task creation & Assignment
- Notification & Approval on the go (Mobile)

Workflow Platform

- Fixed BPMN Template
- DMN for rules
- Customizable by small businesses
- A new BPMN definition per business

Workflow Automation Journey



More Use Cases

- All Approvals (Bill, PO, Estimate etc)
- Internal & External Approvals (Customer, Vendor)
- App Integrations (CRM, eSig, Project Mgmt)
- Expert Engagements with Customers

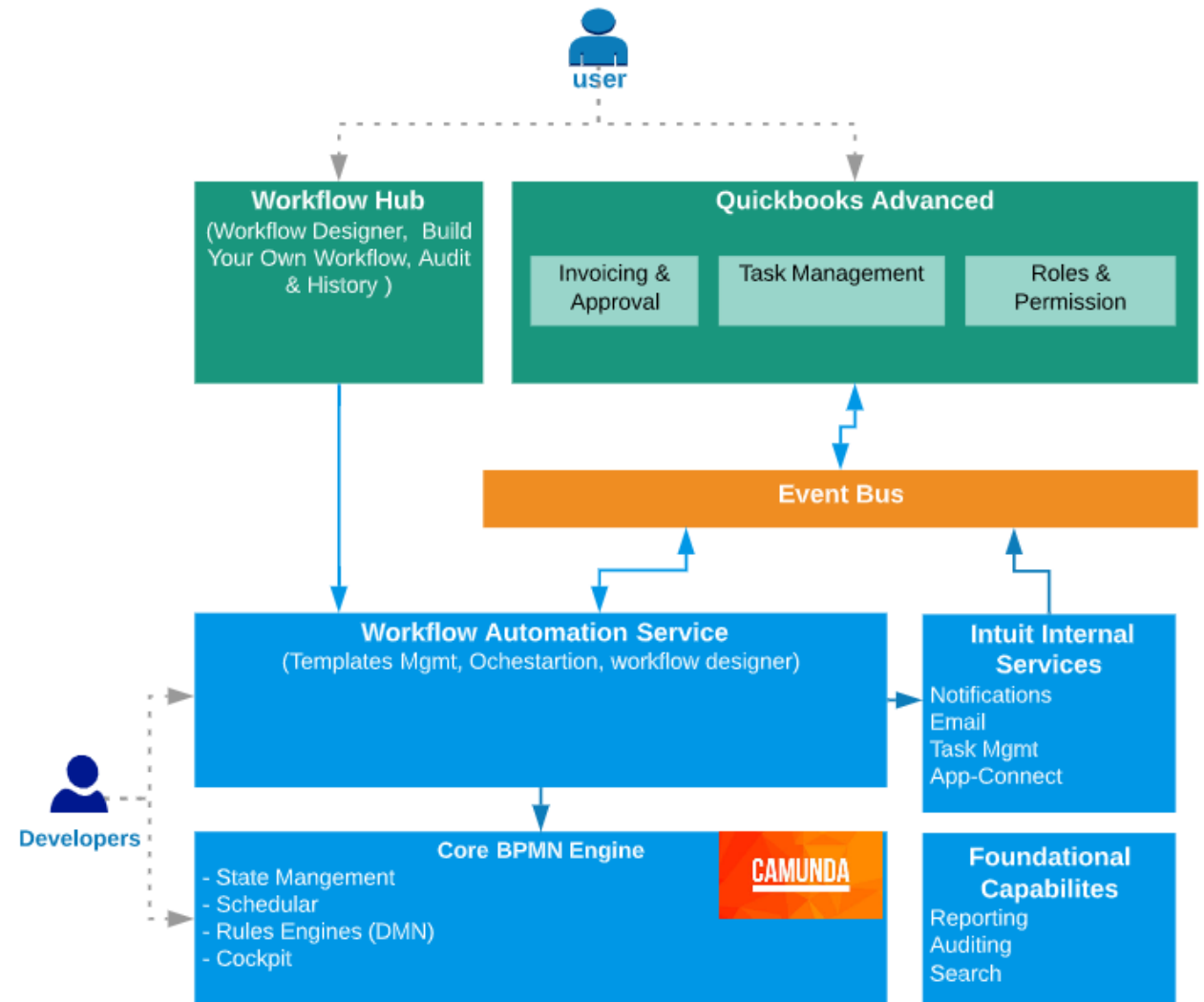
Workflow Platform

- Scaling the Platform to solve for all Small Businesses
- Build you Own Workflow Capability to end-customers
- Integrations with Intuit Services
- Tools & Governance for adding new Workflows

Architecture

Intuit Workflow Automation Platform

- Workflow as a service for customers.
- BPMN concepts abstracted for customers (Workflow Designer)
- Pre-Canned Templates for common workflows
- Integration with Intuit Services
- In-product experiences.
- Async architecture



Camunda Integration

Microservice Architecture

Camunda used as a **separately hosted** service

Abstracted using **Workflow Automation Service**

No direct access to **Camunda Service**

Workflow Automation Service provides a layer of **GraphQL** and **REST** endpoints over Camunda

Asynchronous execution support using Kafka messages

External Tasks

Integration with Intuit Ecosystem using **HTTP** calls and **Kafka** events

Scalable per workflow using separate worker pools

External Task to create **Custom Tasks** in QuickBooks Online

Message Receive tasks to react to events such as Invoice Created

Timers to break out of dormant and stuck workflows

Camunda Cockpit

Integrated with **Intuit Enterprise SSO** for AuthN and AuthZ

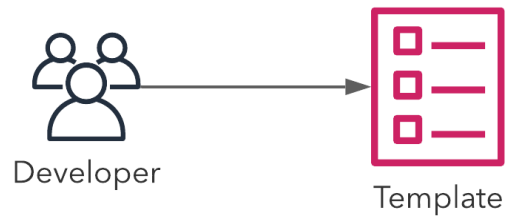
Separate pod setup for Cockpit

Ability to **retry** failed tasks

Ability to **migrate** process instances to new version

Custom plugins for handling large volumes of process definitions and instances

The Lifecycle of a Workflow

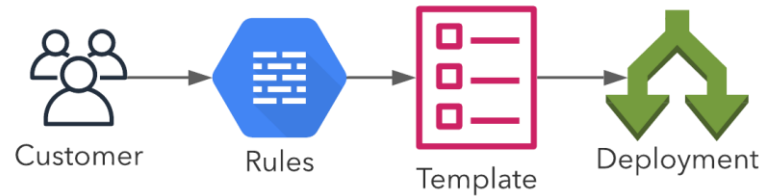


Declaration

Developers **design** the templates (BPMN + DMN) according to the workflow use case.

Developers **save** the template in Workflow Automation Service.

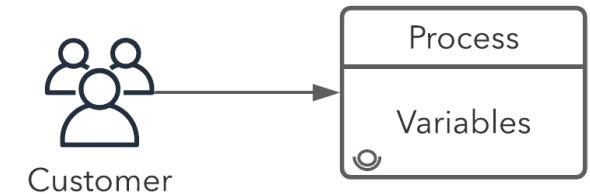
Customers see a simplified UI for the workflow.



Definition

Customers **define** the workflow parameters and rules in QuickBooks Online.

Each customer **configuration** is integrated with the saved template to create a new process definition in Camunda.



Execution

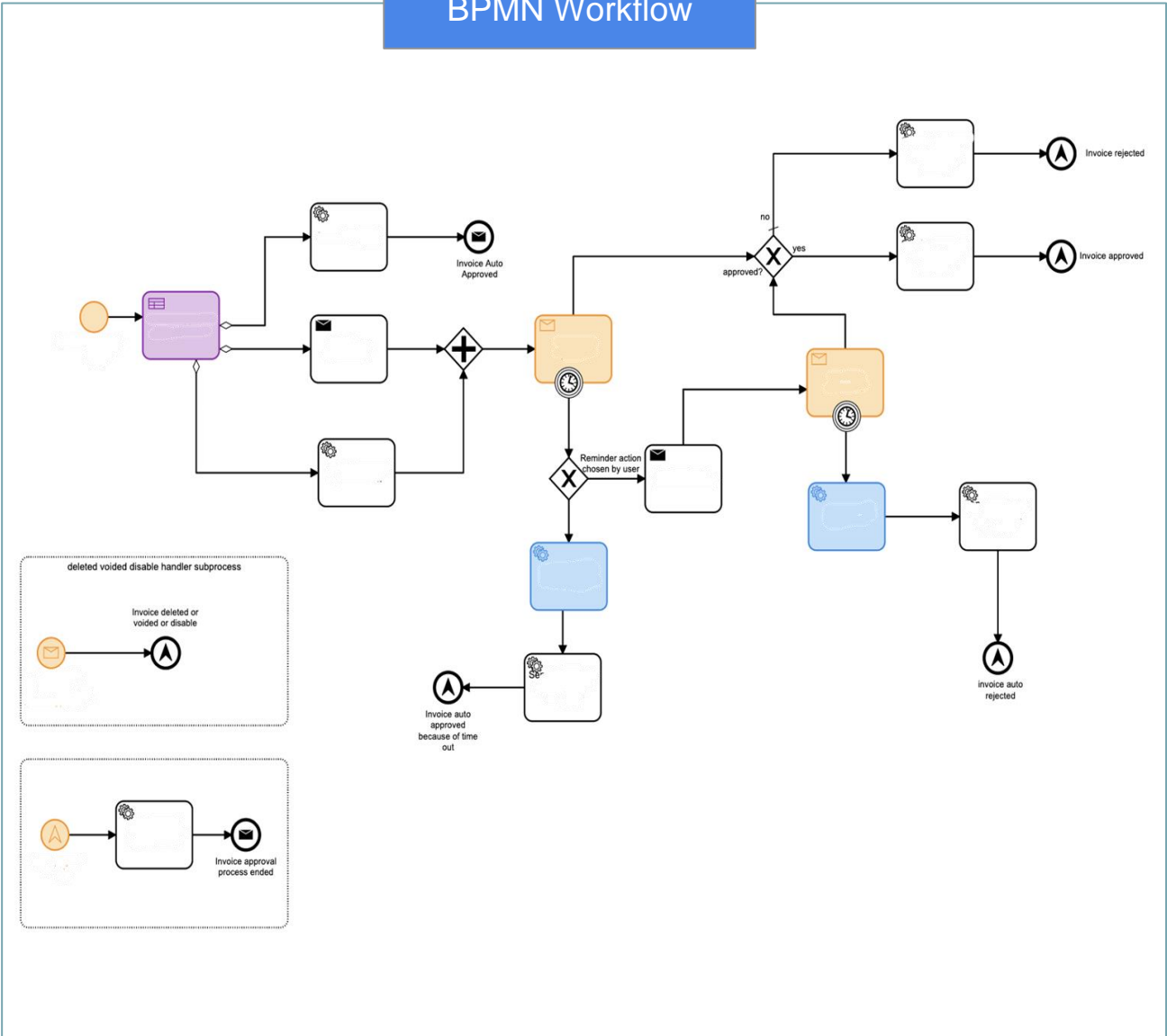
Customers perform actions in QuickBooks Online (like Invoice generation).

Each action **triggers** a new process instance in Camunda.

Each update to an existing action **signals** the running process in Camunda.

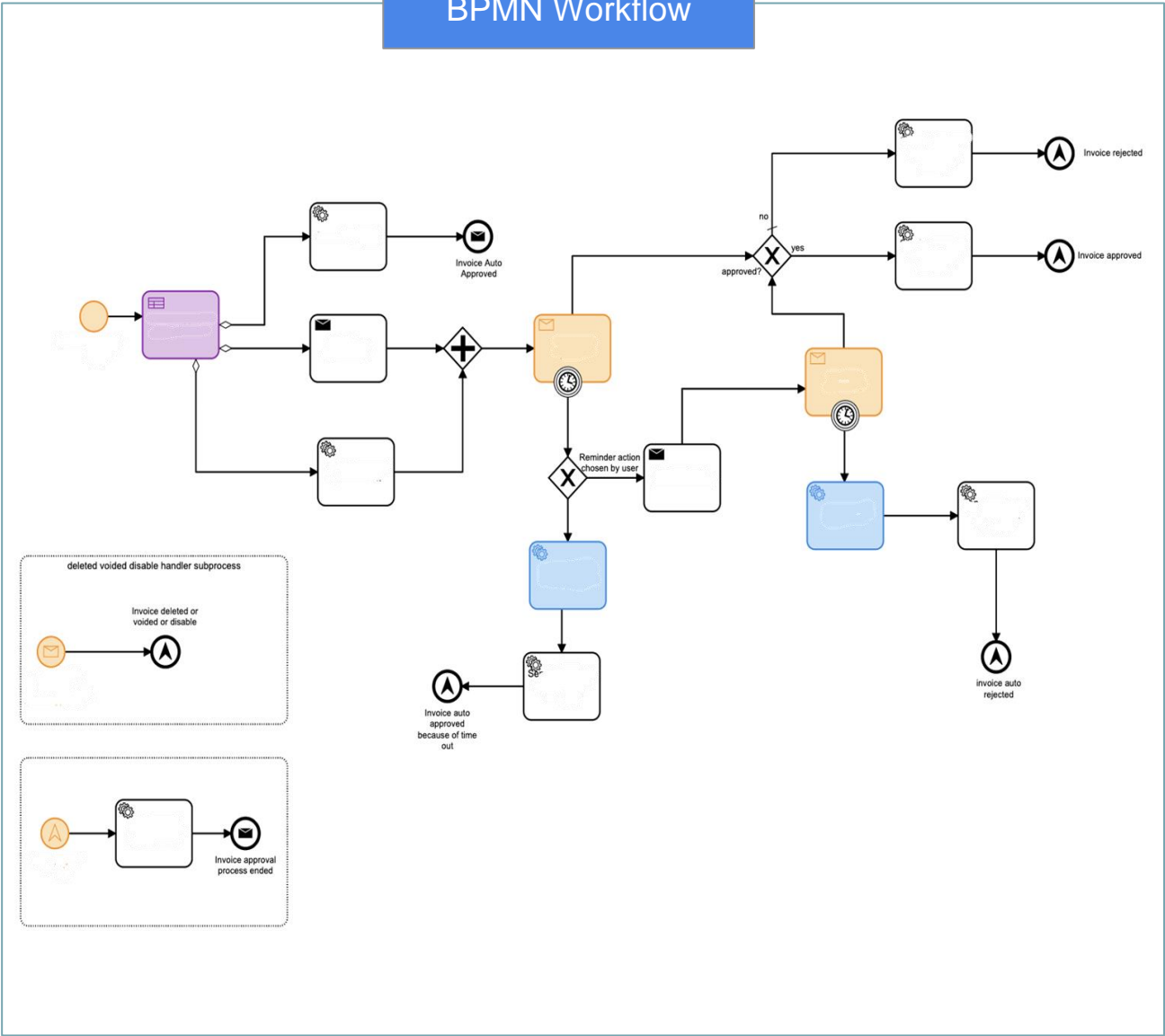
Workflow Perspectives

BPMN Workflow



Workflow Perspectives

BPMN Workflow



User Workflow

Details

An invoice approval workflow can help you control the accuracy of invoices you send to customers so you can get a paid faster

Name

Invoice Approval

Conditions

Decide when an invoice needs to be approved

Condition#1

Invoice amount greater than or equal to 100

Add Condition

Actions

Approval tasks will be created for them in Tasks

Create Task For Anil Sharma

Send notification Send to Anil Sharma email mobile

If Not Approved within 5 day(s) Send reminder to approver

- invoice created by admin are auto-approved.
- Recurring invoice will not go through the approval process.

Email

Send to

Anil Sharma

Add CC Add BCC

Subject

Invoice DocNumber requires approval

Message

Hello,

Invoice DocNumber is pending approval. Please approve it at the earliest using this task manager link - <https://qbo.intuit.com/login?pagereq=https://qbo.intuit.com/app/taskmanager>

Note that invoices that are not approved for more than 30 days will remain unapproved.

Scale

Current

Use Cases Supported

Invoice Approval
4 Reminder Workflows
1 External App Integration

User Base

QBO Online Advanced

of Definitions

1K+

of Txns

10K +

of Instances

100K

Scale

Current

Upcoming

Use Cases Supported

- Invoice Approval
- 4 Reminder Workflows
- 1 External App Integration

User Base

QBO Online Advanced

of Definitions

1K+

of Txns

10K +

of Instances

100K

Use Cases Supported

- 4+ Approvals
- 8 Reminder Workflows
- 3+ External App Integration
- 4+ Expert Engagements

User Base

QBO Online
Expert Engagements (QB, TT)
Payroll & Payment Offerings

of Definitions

10K+

of Txns

~M/day

of Instances

~M/day

Workflows at Scale

Infrastructure

Different swimlanes for noisy neighbour

Multi-tenant architecture

Separate databases per client

Multi-Region HA/DR deployment

Non-blocking workers

Separate worker pools per workflow type

Testing

Karate based automation tests

Gatling tests for performance tests

Automated FMEA tests using Chaos Monkey

Production War Games

Observability

Micrometer and Prometheus based metrics

Wavefront for dashboards and alerts

Real-time alerting using PagerDuty

Jaeger based traces using OpenTracing

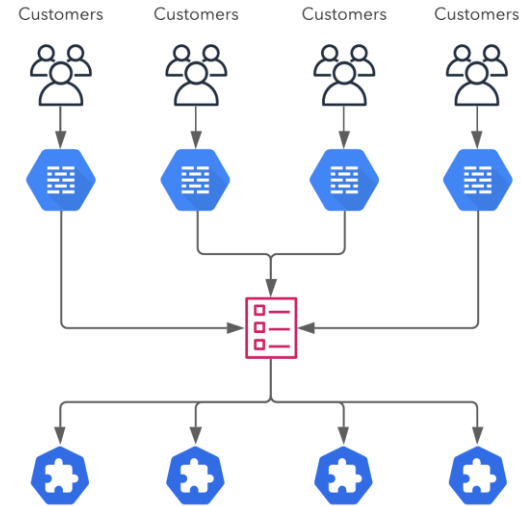
Unique Challenges

Workflow as a Service

- Multiple BPMN definitions per customer for same template.

Scale for multiple definition processes

Template version management



Workflow as a Service

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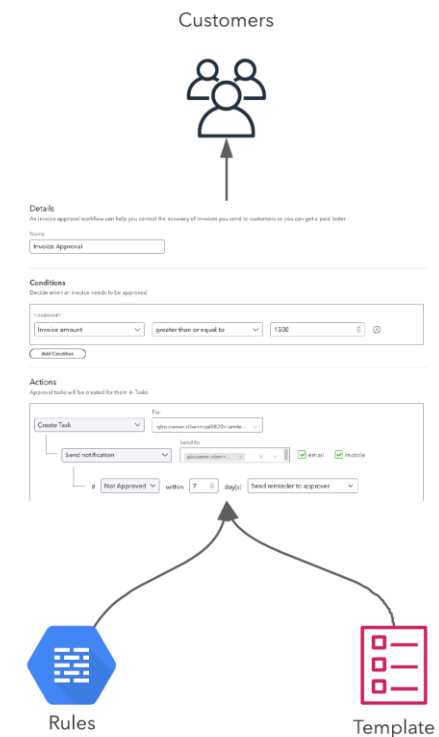
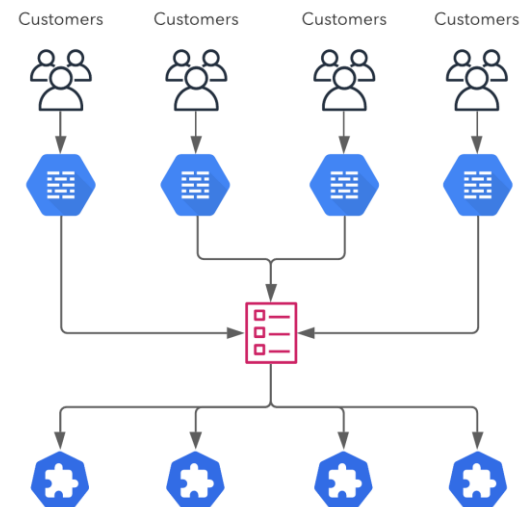
Scale for multiple definition processes

Template version management

- Customer configurable workflows

Mapping BPMN to small business domain

Transformation to & from BPMN to different model



Workflow as a Service

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Scale for multiple definition processes

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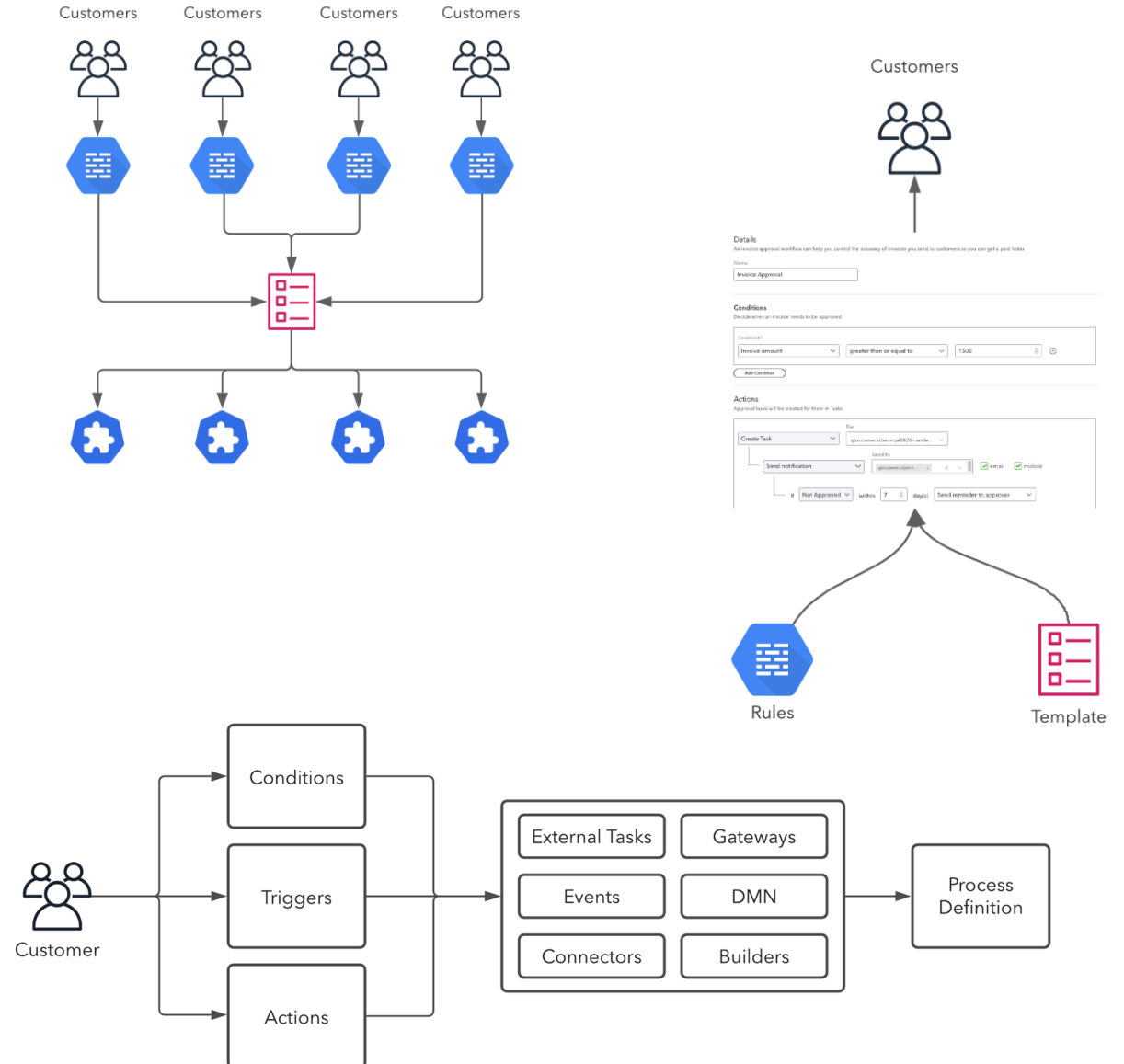
Mapping BPMN to small business domain

Transformation to & from BPMN to different model

- Build your own workflows.

Registry for BPMN building blocks


Dynamically generating BPMN & DMN



Support from Camunda

Multiple JIRA cases and timely patch releases

Architecture discussion with CTO



Support / SUPPORT-7658

What might be problems that might occur with more than 70,000 process definitions

Watch issue

Watchers

Export

Details

Type: Help Request

Priority: L3 - Default

Component/s: camunda-runtime, ... (1)

Labels: camunda-runtime, spring-boot

Customer Domain: intuit.com (Find related issues)

cid: intuit_qbo_quickbooks_online

SLA-Package: std_8_8_16

CLOSED

Fixed

Private Support Case

(Only visible to you and the authorized support contacts you add)

SLAs

People

Assignee:

Reporter:

Authorized support contacts:

Participants :

Organizations: None

CSM:

Description

Where can we help you?

What are potential limitations in having more than 70,000 process definitions deployed?

added a comment - 29/May/20 1:38 PM

Hi

We have provided a bugfix for this problem with a patch release for 7.11.13. The release can be downloaded here: <https://docs.camunda.org/enterprise/download/>

In case you encounter any further problems or have any remarks, this issue can be reopened at any time.

Awesome Tech Support

- SUPPORT-8292
External Task Fetch and Lock Iss...
- SUPPORT-8032
Error in Deleting Definition : cac...
- SUPPORT-7685
Start Process taking long time fo...
- SUPPORT-7631
Cockpit Performance Issue: [Co...
- SUPPORT-7477
2 entries with same version crea...
- SUPPORT-7458
High DB query time seen for fetc...
- SUPPORT-7388
400 BAD REQUEST when deploy...

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CON
2020.2

Questions?

