Bullhorn for Salesforce
WORKFORCE EDITION

Technical Guide

Workforce Edition

BH4SF and WFM Integration

Document version 1.01

Workforce Edition 2.2

Bullhorn®

WORKFORCE EDITION

1 Document Scope

Technical Guide for version 2.2 of the Workforce Edition integration between Bullhorn Workforce Management and Bullhorn for Salesforce. This requires WFM version 3.2 or later and Bullhorn for Salesforce version 5.80.7 or later.

2 Table of Contents

3 Overview

Sirenum by Bullhorn provides best-in-class workforce management for hourly workers hosted in the Salesforce ecosystem, with the solution firmly focused on Shifts and Workers. The ability to combine Bullhorn Workforce Management (aka WFM, previously known as Sirenum) with the Bullhorn for Salesforce (aka Talent Rover) package allows customers to leverage WFM's powerful shift-based features with the ATS (and other) facilities from Bullhorn for Salesforce in a unified and seamless manner.

A consultant can create a Job, search for appropriate workers, create Closing Reports to represent placement of Workers to a Job and have the Shifts automatically managed by the system. Alternatively, a consultant can create some Shifts and build a Job from them, with Closing Reports automatically generated as needed. A consultant can mix and match these approaches as they see fit.

The primary integration points are:

- The Bullhorn for Salesforce Job object, enhanced to support Shift work including WFM's:
  - Shift Demand Generation.
  - Lightning Schedule.
  - Worker Search.
- The Bullhorn for Salesforce Closing Report object, enhanced to support Shift work including WFM's:
  - Shift Demand fulfilment.
  - Lightning Schedule.
  - Creation from Worker Search.

At a more technical level, this integration is designed to support:

1. Job (`TR1__Job__c`) instead of Job Order (`sirenum__JobOrder__c`):
   a. Structured (with a defined Work Schedule (`sirenum__WorkSchedule__c`) and with automated Shift Demand (`sirenum__Shift__c`) generation).
   b. Unstructured (without a Work Schedule and using manual Shift Demand/Shift creation).
   c. Find Work, Find Workers and Manage Invitations at the Job level, based on available Shift Demands or Work Schedule details (for Pending Shift Demand Generation structured Job cases). These Logic Services result in the creation and management of Closing Reports.
   d. Mapping Job cancellation through to Shift Demand and Shift cancellation.
2. Closing Report (`TR1__Closing_Report__c`) as a type of "placement":
   a. With optional automated Shift creation from Shift Demands, with or without time domain constraints.
   b. With optional automated Shift matching and automated missing Closing Report creation, with or without time domain matching.

In principle Shift Demand generation, Shift vs Closing Report matching and Closing Report creation automations can be applied to any type of Job and Closing Report. However, the bundled Workforce Edition app:

- Adds a “Shift Work” Record Type for both Job and Closing Report:
  - Shows the WFM functionality only on the layouts for this Record Type.
- Applies a single configured Record Type when auto-generating Closing Reports:
  - This is a limitation that can be worked around as per the detail in Appendix B (section 8).

The Workforce Edition enables consultants to view Schedules and leverage WFM’s various logic services with Job- and Closing Report-focused functionality. It can also be used with Connect to enable workers to receive and respond to Shift- or Job-based Job Offers and to find available Jobs. See Appendix C (section 9) for details.

This document references various WFM APIs. Documentation for those APIs is available separately.

4 Object Model

This integration uses and extends both WFM and Bullhorn for Salesforce objects. These extensions exist in the “s5m” namespace.

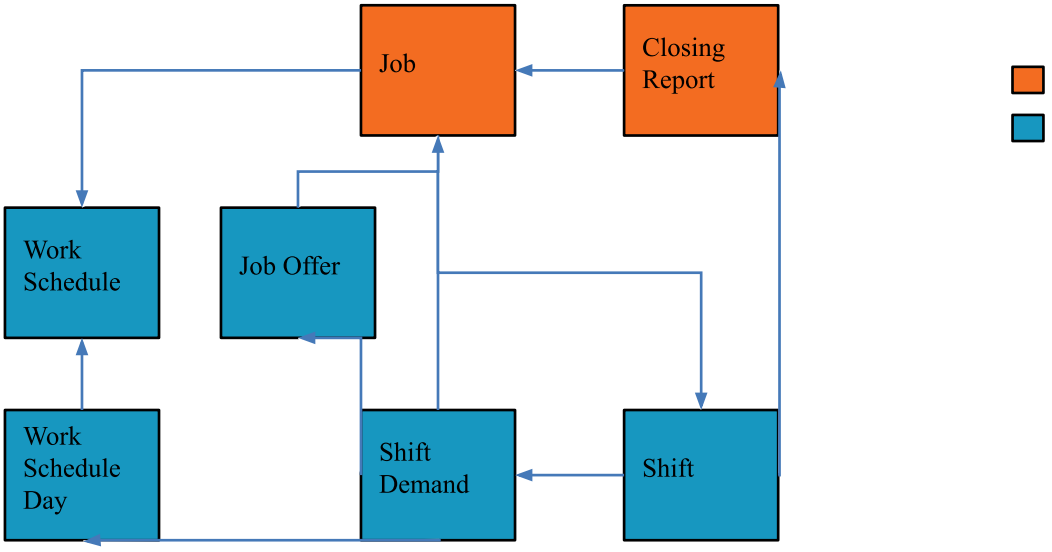


Figure 1 - Object Model

4.1 Job

Note that the following table covers the fields added to `TR1__Job__c` that are not purely for internal use by the integration logic.

Table 1 - Job Additional Fields

Field	Type/Default	Required	Description
s5m__BH4SFCompetencyBundle__c	Lookup (sirenum__CompetencyBundle__c)	No	This allows changes to be applied to the Competency requirements for the Job.
s5m__BH4SFFillRateByClosingReports__c	Formula (Number)	No	A percentage fill rate for the Job based on the number of openings and the number of closing reports.
s5m__BH4SFNumberOfClosingReports__c	Rollup (Summary)	No	The number of uncancelled Closing Reports defined for the Job.
s5m__WorkSchedule__c	Lookup (sirenum__WorkSchedule__c)	No	When defined allows automated generation of Shift Demands for the Job. Works in conjunction with s5m__ShiftDemandGeneration__c.
s5m__WorkScheduleOffset__c	Integer/0	No	Identifies an offset to be applied to select the first working day when using a non-aligned Work Schedule. This is not presented in the OOTB layouts (see section 5.1) but is available if required.
s5m__AutoFulfil__c	Checkbox/FALSE	No	Propagated to generated Shift Demands.
s5m__ShiftDemandGeneration__c	Picklist (Pending, Ongoing, Fully Planned, Done)/Pending	No	Controls Shift Demand generation for structured jobs. The user must explicitly set this to “Ongoing” to request Shift Demand generation. The system will automatically transition to Fully Planned (all Shift Demands have been generated) or Done (Job end date is in the past) as needed, but the user can also do this. This is presented by a Path control in the OOTB lightning page (see section 5.2).

s5m__GenerationLastError__c	Text (255)	No	Can be presented, read-only, to the user. When non-blank this indicates there was a problem when generating Shift Demands. The user may be able to resolve the issue for themselves, but if not should draw the admin's attention to the problem. After resolving the problem, the user can use the "Restart Generation" quick action. See section 5.3.6 for details.
s5m__JobType__c	Lookup (sirenum__Job_Type__c)	Yes [1]	Details that are used when populating Shift Demands and used by WFM when executing Logic Services and Rule Evaluation.
s5m__Contract__c	Lookup (sirenum__ProActiveContract__c)	Yes [1]	
s5m__JobRole__c	Lookup (sirenum__Team__c)	Yes [1]	
s5m__Site__c	Lookup (sirenum__Site__c)	No	
s5m__Location__c	Lookup (sirenum__Location__c)	No	
s5m__Rota__c	Lookup (sirenum__Rota__c)	No	
s5m__Cancelled__c[2]	Checkbox/FALSE	No	While typically not presented to the user, these values are derived from the Job's Status and Closed Reason using a flow. However, this flow can be disabled and an alternative approach adopted as required in the implementation.
s5m__CancellationReason__c	Picklist (sirenum__CancellationReason global value set)	No	

Note that the integration uses the Job's `TR1__Estimated_Start_Date__c` and `TR1__Estimated_End_Date__c` to define the date range within which Shift Demands will be generated. Note that the end date is optional. It is necessary to set the Job's `TR1__Number_of_Openings__c` to a positive value before the Shift Demand Generation state can be set "Pending".

[1] Either the Job Type and Contract must be specified, or the Job Role. When specifying Job Type and Contract, the Job Role is automatically managed (re-using existing Job Roles or generating new ones as needed). When the Job Role is specified, the Job Type and Contract are automatically derived from it.

[2] An implementation can opt to propagate the Job's `TR1__Closed_Date__c` to the Shift/Shift Demand `sirenum__CancellationDate__c` using the functionality described in section 6.2, or can provide its own flow to handle this and other cancellation functionality as outlined in section 6.2.1.

4.2 Closing Report

Note that the following table covers the fields added to `TR1__Closing_Report__c` that are not purely for internal use by the integration logic. See Appendix B (section 8) if support is required for more than a single Record Type for Shift-based Jobs and related Closing Reports.

Table 2 - Closing Report Additional Fields

Field	Type/Default	Required	Description
s5m__Accepted__c	Checkbox/FALSE	No	Tracks whether the Closing Report was created from an accepted Job Offer or has otherwise been accepted by the worker.
s5m__AutoAssign__c	Checkbox/TRUE	No	Controls whether the system will automatically generate Shifts for the Closing Report's Placed Person (the worker) from the Job's matching Shift Demands.
s5m__AutoGenerated__c	Checkbox/FALSE	No	Indicates whether the Closing Report was automatically created against the Job for a worker with at least one Shift for that Job. See section 6.3.

4.3 Work Schedule

The `sirenum__CycleLength__c` in the `sirenum__WorkSchedule__c` is generally not relevant to the use of work schedules in the context of Jobs. Because of this, the Workforce Edition app does not present this value on the Work Schedule layout/compact layout.

4.4 Shift Demand/Shift

Both Shift Demands and Shifts are represented by `sirenum__Shift__c` records. The following table covers the fields added to `sirenum__Shift__c` that are not purely for internal use by the integration logic.

Table 3 - Shift Additional Fields

Field	Type/Default	Required	Description
s5m__Auto_Generated__c	Checkbox	No	Only relevant for Shifts, this indicates that the Shift was automatically generated for a worker with a Closing Report from a Shift Demand for the related Job. Should be treated as read only.
s5m__BH4SFAutoFulfil__c	Checkbox/TRUE	No	Only relevant for Shift Demands and then only those that are related to a Job. Controls whether the system should automatically generate Shifts for this Shift Demand against matching Closing Reports' Placed Persons.
s5m__BH4SFClosingReport__c	Lookup (TR1__Closing_Report__c)	No	Only relevant for Shifts, and then only those that are related to a Job. References the Closing Report to which the Shift is related. This is automatically updated if the matching to the Closing Report is inappropriate.
s5m__BH4SFJob__c	Lookup (TR1__Job__c)	No	Relevant to both Shift Demands and Shifts. References the Job to which the record is related. Without this value the integration applies no automation against the record regardless of the Auto Fulfil value.

It should be noted that a Shift Demand can only be associated with either a WFM Job Order or a Bullhorn for Salesforce Job, not both (though it may be associated with neither).

4.5 Job Offer

Note that the following table covers the fields added to `sirenum__Shift_Invitation__c` that are not purely for internal use by the integration logic. This enables use of Job Offer with either a Job or a Shift/Shift Demand, and includes fields that help in presenting Job Offers to workers though Connect for Salesforce or a digital experience.

Table 4 – Job Offer Additional Fields

Field	Type/Default	Required	Description
s5m__BH4SFCancelled__c	Formula (Checkbox)	No	The offer's associated Job or Shift Demand's Cancelled status.
s5m__BH4SFClientName__c	Formula (Text)	No	The offer's associated Job or Shift Demand's Client Account name.
s5m__BH4SFContractName__c	Formula (Text)	No	The offer's associated Job or Shift Demand's Contract name.
s5m__BH4SFEndDate__c	Formula (Date)	No	The offer's associated Job or Shift Demand's end date.
s5m__BH4SFForecastPay__c	Formula (Number)	No	The offer's associated Shift Demand's forecast pay.
s5m__BH4SFJob__c	Lookup (Job)	No	The offer's associated Job. Only one of this or sirenum__Shift__c can be populated, this being enforced via a validation rule.
s5m__BH4SFJobTypeName__c	Formula (Text)	No	The offer's associated Job or Shift Demand's Job Type name.
s5m__BH4SFNotes__c	Formula (Text)	No	The offer's associated Shift Demand's scheduling comments.
s5m__BH4SFSiteCity__c	Formula (Text)	No	The offer's associated Job or Shift Demand's Site's city.
s5m__BH4SFSiteLatitude__c	Formula (Number)	No	The offer's associated Job or Shift Demand's Site's geocoordinates.
s5m__BH4SFSiteLongitude__c			
s5m__BH4SFSiteName__c	Formula (Text)	No	The offer's associated Job or Shift Demand's Site name.
s5m__BH4SFSiteStreetAddress__c	Formula (Text)	No	The offer's associated Job or Shift Demand's Site's street address.
s5m__BH4SFStartDate__c	Formula (Date)	No	The offer's associated Job or Shift Demand's start date.

Field	Type/Default	Required	Description
s5m__BH4SFWorkScheduleName__c	Formula (Text)	No	The offer's associated Job's Work Schedule name. This should be descriptive in explaining the working pattern the Job requires.

The various cross-object formula fields exist to allow access to the relevant detail without the user requiring sharing access to the underlying Job or Shift Demand.

5 User Experience

This package comes with a pre-built "Workforce Edition" Salesforce app. The content of this app is described below.

5.1 App Nav Bar

The Workforce Edition app includes the following pre-defined tabs.

Tab	Description
Home	A simple home page that includes various lists to help the consultant focus on necessary activities.
Schedule	The non-contextual Lightning Schedule including Workforce Edition specific views and actions. See section 5.2 for additional detail.
Map	The standard WFM map view with the default or configured map definitions.
Accounts	For viewing and/or managing the relevant records, as per the user's permissions.
Jobs	
Closing Reports	
Sites	
Contacts	
Shifts	
Timesheets	
Invoices	
Time & Attendance	Access a dashboard for monitoring problematic Shifts and managing Sirenum Clock locations and associated Tags.
Reports	Access to configured ATS and WFM reports.

5.2 Lightning Pages, Layouts and the Lightning Schedule

The Workforce Edition app includes tailored Lightning Record Pages and integration-specific layouts for:

- TR1__Job__c (Job)
- TR1__Closing_Report__c (Closing Report)
- Account
- Contact
- sirenum__ProActiveContract__c (WFM Contract)
- sirenum__Site__c (Site)
- sirenum__Shift__c (Shift)
- sirenum__Shift_Invitation__c (Job Offer)

Specific layouts are provided for the “Shift Work” record type for both `TR1__Job__c` and `TR1__Closing_Report__c`. Specific layouts are also provided for the “Shift” and “Shift Demand” record types for `sirenum__Shift__c`. The various layouts include both standard and Workforce Edition specific details.

The Lightning Record Pages for Job, Closing Report, Account, Contact, WFM Contract and Site include the Lightning Schedule in addition to other, conventional tabs. The Job page additionally includes several useful Quick Actions designed to assist in managing and fulfilling “Shift Work”. See section 5.3 for details.

The Lightning Schedule configuration for each page (and for the non-contextual Schedule tab) is defined using a `sirenum__ScheduleDefinition__mdt` custom metadata type record. These are JSON configuration documents conforming to the prevailing Schedule Definition schema version, being https://sirenum.com/schema/2022/04/schedule-definition.json, the version first shipped with Sirenum 3.0 (Summer 2023).

Each lightning record page is assigned its own Schedule Definition via the component’s configuration in the page, as illustrated in Figure 2. Only those definition(s) valid for the given page are offered as options, based on the definition’s `objectType` or `contextIds` specification.

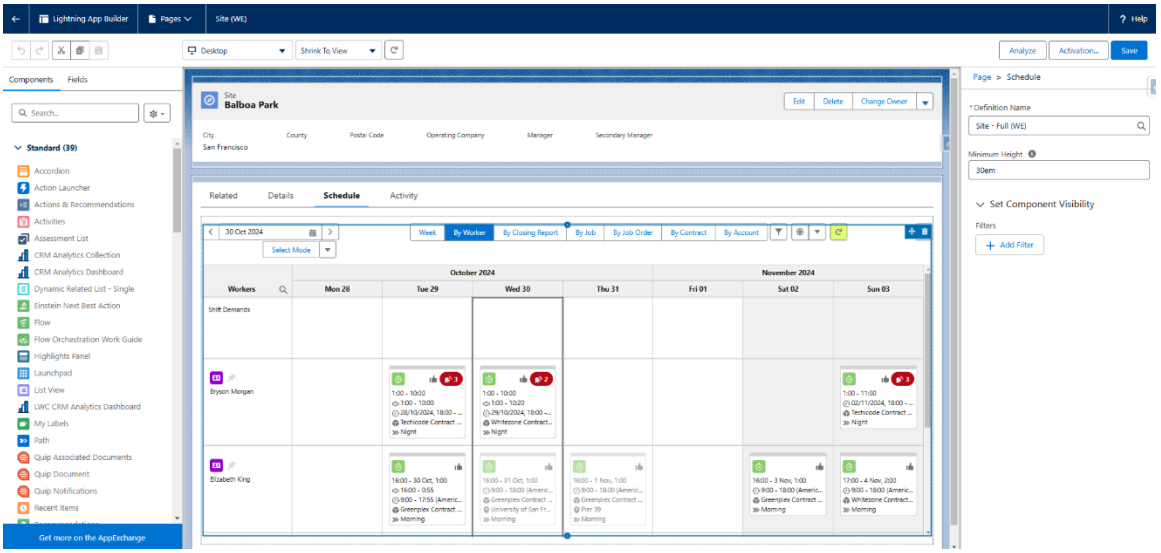


Figure 2 - Lightning Schedule Configuration

The OOTB configurations include presentation of and actions for:

- Special Dates (no actions)
- Shifts
- Employee Requests (most commonly as auxiliary data in By Worker grid views, but also as primary data in the non-contextual Schedule)

The grid views available in the schedules are (NB: the contextual object's grid view is omitted in each case):

- By Worker
- By Closing Report
- By Job
- By Job Order
- By Site
- By Contract
- By Account

Views are only shown when the user has appropriate permissions to read the objects and their relationships.

In addition to all the standard actions available in the standard WFM schedules, Workforce Edition includes:

- Presentation of a Shift/Shift Demand's related Closing Report and Job, as applicable.
- Job-based Find Work (finding Jobs starting around the selected date for a given Worker).
- Job-based Find Workers (finding Workers for the Job associated with a selected Shift/Shift Demand).

Other lightning record pages and layouts are available from the underlying WFM and Bullhorn for Salesforce packages. The WFM package also provides many other entries in the "All Items" list accessed from the App Launcher, allowing management of things like Sites, Rotas, Rate Cards, Work Schedules, Payroll etc.

5.2.1 Job's Worker Search

Where this tab still exists on the "Workforce Edition" app's Bullhorn for Salesforce Job (`TR1__Job__c`) lightning record page, this should be deleted as it has been superseded by other logic service functionality.

5.3 Quick Actions and Flows

5.3.1 Job's "Clone Work Schedule" Quick Action

This Quick Action invokes the "Job: Clone Work Schedule" (`BH4SFJobCloneWorkSchedule`) screen flow to create a job-specific clone of the Work Schedule and its Work Schedule Days, updating the Job to reference this new clone. Any error during cloning is displayed to the user. The user must click the Finish button on the flow to see the updated Job.

5.3.2 Job's "Delete Shift Demands" Quick Action

This Quick Action invokes the "Job: Delete Shift Demands" (`BH4SFJobDeleteShiftDemands`) screen flow to delete all the Shift Demands related to the Job. This Quick Action is not included in the Job's page layout by default since deletion of data is typically not an appropriate approach (it is normally better to cancel the Job than to delete it and its Shift Demands).

The deletion is handled by a batch execution and may, therefore, take a while to complete. Note that a given user cannot have 2 instances of this batch queued or executing at any one time, and no Job can be submitted for parallel processing. As with standard WFM functionality, deleting a Shift Demand will not necessarily delete its Shifts, depending on their status. Any deletion failures are reported via email to the user who initiated the deletions. The following labels are used when generating this email:

- `BH4SFJobDeleteShiftDemandsOnDateRangesEmailSubject`
- `BH4SFJobShiftDemandDeletionError`
- `BH4SFJobShiftDemandDeletionErrors`
- `BH4SFJobShiftDemandDeletionErrorsBody`

5.3.3 Job's "Find Workers" Quick Action

This Quick Action invokes the "Find Workers for Job" (`BH4SFFindWorkersForJob`) flow to allow the consultant to search for (additional) Workers capable of performing the Job and to optionally create appropriate Closing Report(s) for select Worker(s).

5.3.4 Job's "Manage Invitations" Quick Action

This Quick Action invokes the "Manage Job Offers" (`BH4SFManageJobOffers`) flow to allow the consultant to review existing Job Offers (where they can revoke offers, or approve/reject applications to managed offers) or search for (additional) Workers capable of performing the Job and to optionally create appropriate Job Offer(s) for select Worker(s).

When a Worker accepts a Fastest Finger First Job Offer, or a consultant approves a Managed Job Offer, a Closing Report is generated for that Worker against the Job. This Closing Report is marked as Accepted, which allows later automatic acceptance of auto-assigned Shifts. See section 6.4 for more details.

5.3.5 Job's "Publish All" Quick Action

This Quick Action invokes the "Job: Publish All" (`BH4SFJobPublishAll`) screen flow to publish any of the Job's Shifts that have not yet been published. Since the Job may have many hundreds of Shifts, this processing is handled by a batch execution and may, therefore, take a while to complete. This batch processes a number of shifts together as defined by `sirenum__Sirenum_Global_Settings__c`'s `sirenum__Scheduling_Save_Shifts_Chunk_Size__c`. Note that a given user cannot have 2 instances of this batch queued or executing at any one time, and no Job can be submitted for parallel processing.

Publications that fail due to validation failures do not cause this processing to fail but are instead recorded by creating one `sirenum__LogEntry__c` record per failed shift

with `sirenum__Category__c` set to “Job Publish Batch”, `sirenum__Severity__c` set to “Error” and the `sirenum__Details__c` capturing the validation failure message(s).

Successful or failed processing is notified via email to the user who initiated the publication. The following labels are used when generating this email:

- `BH4SFJobPublishAllCompletedMailSubject`
- `BH4SFJobPublishAllAbortedMailSubject`
- `BH4SFJobPublishAllCompleted`
- `BH4SFJobPublishAllNoErrors`
- `BH4SFJobPublishAllFailDetails`
- `BH4SFJobPublishAllAborted`

5.3.6 Job’s “Restart Generation” Quick Action

This Quick Action invokes the “Restart Generation” (`BH4SFRestartGeneration`) flow allow Shift Demand Generation to be restarted for a Job that previously suffered an error during generation.

If an error happens during generation, the Job’s Generation Last Error (`s5m__GenerationLastError__c`) field is updated to show the (first part of the) error description. Further generation is then prevented until a consultant or admin has investigated the reason for the problem and resolved it. Using this quick action then restarts the generation process, ensuring that the internal state for Shift Demand Generation is clean and consistent beforehand.

6 Automation

The following features are all based on the Sirenum Adaptive Batch functionality (see section 7.1 for more information).

6.1 Shift Demand Generation

The generation of Shift Demands for “structured jobs” (i.e. `TR1__Job__c` records that have a related `sirenum__WorkSchedule__c` defined in the `s5m__WorkSchedule__c` field) is controlled by the “Create Shift Demands for BH4SF Jobs” (`s5m.BH4SFCreateShiftDemandsForJobs`) adaptive batch. Disabling this adaptive batch (via its Adaptive Batch Settings record) will prevent any automated generation of Shift Demands for Jobs. Note that this adaptive batch is supported by the “BH4SF Job Processor” (`s5m.BH4SFJobProcessor`) scheduled job which ensures that the adaptive batch is invoked automatically once a day to handle the incremental Shift Demand generation required for long-term and open-ended Jobs.

When enabled, Shift Demands are generated for Jobs without “Generation Last Error” values when the Job’s Shift Demand Generation state is not “Pending” or “Done”, and when the Job’s start date or end date values change.

- When the Shift Demand Generation state changes from “Pending” to “Ongoing”[3] the Shift Demands for the first *n* days in the Job are generated, where *n* is the number of days between the Jobs start and end dates or the

[3] The ability to change state is constrained to ensure that key details have been set appropriately.

`sirenum__Sirenum_Global_Settings__c`'s `sirenum__Job_Order_Shift_Demand_Horizon__c`, whichever is the smaller. Note that the horizon should not be set too high as this could cause governor limits to be violated and the generation to be aborted.

- When the "Ongoing" or "Fully Planned" Job's start and/or end dates change then Shift Demands will be generated for any new dates incorporated into the Job (assuming there is no "Generation Last Error"). Caution should be exercised in making start and/or end date changes against Jobs that are "Ongoing" or "Fully Planned" since this can:
  - Shift the Work Schedule pattern inappropriately, if the Work Schedule is not aligned and the start date is moved by a number of days that is not a multiple of the Work Schedule's Total Length.
  - Cause too many Shift Demands to be generated in a single transaction, thereby causing governor limits to be violated.
- Note that changing the start or end dates can also cause Shift Demands to be deleted. Deletion failures are notified to the user who created the Job via a localizable email. The `BH4SFJobDeleteShiftDemandsOnDateRangesEmailSubject`, `BH4SFJobDeleteShiftDemandsOnDateRangesShiftErrorsSeparator`, `BH4SFJobDeleteShiftDemandsOnDateRangesBH4SFJobShiftDemandErrors` and `BH4SFJobDeleteShiftDemandsOnDateRangesEmailBody` labels are used when generating this email.

The selection of fields for which values are propagated from the job to the shift demands is the same as per later update propagation. See section 6.2 for details.

6.2 Propagating BH4SF Job Fields to Shift Demands and Shifts

The propagation of changes to field values from a Job (`TR1__Job__c`) record to its related Shift Demands and its uncancelled and unfinished Shifts that are not related to Shift Demands (all represented by `sirenum__Shift__c` records) is handled by the "`Propagate BH4SF Job Fields`" (`s5m.BH4SFJobPropagation`) adaptive batch. Disabling this adaptive batch (via its Adaptive Batch Settings record) will prevent any automated propagation of field values from the Job to its Shift Demands/Shifts.

This adaptive batch uses configuration obtained from the `sirenum__NamedSetting__mdt` custom metadata type record with API/Developer Name "`BH4SFJob_To_Shift_Mapping`". This configuration is a JSON document conforming to the http://sirenum.com/schema/2020/04/bh4sf-job-to-shift-demand-propagation.json schema which defines the mapping of job fields to shift fields that must be propagated. Note that, when configured, the `sirenum__Broadcasts__c` field is never targeted in a plain Shift, only in a Shift Demand.

The package provides an OOTB named setting with a standard definition of the data to be propagated[4].

[4] This does not cover cancellation date which can be selectively added by the implementation as required.

6.2.1 Cancellation

Jobs (`TR1__Job__c`) are cancelled by setting an appropriate cancellation reason value in the Close Reason and setting its status as Closed. Other Close Reasons are not deemed to represent cancellations.

The integration includes two OOTB auto-launched flows that map the job state through to the `s5m__Cancelled__c` and `s5m__CancellationReason__c` fields as follows:

- "Job: Cancellation" (`BH4SFJobCancellation`), marking the job as cancelled (`s5m__Cancelled__c` TRUE) when `TR1__Status__c` is set "`Closed`" and the `TR1__Closed_Reason__c` is set:
  - "`Cancelled by Client`": sets `s5m__CancellationReason__c` "`Cancelled by Client`".
  - "`Cancelled by Job Owner`": sets `s5m__CancellationReason__c` "`Cancelled by Consultant`".
  - "`Competitor Filled`" or "`Client Filled`": `s5m__CancellationReason__c` "`Filled Externally`".
- "Job: Reset Cancellation" (`BH4SFJobResetCancellation`), clearing cancellation (`s5m__Cancelled__c` FALSE and `s5m__CancellationReason__c` NULL) when the `TR1__Status__c`/`TR1__Closed_Reason__c` combination no long represents cancellation.

The `s5m__Cancelled__c` and `s5m__CancellationReason__c` fields are compatible with the equivalent fields in Shift Demand and Shift and therefore can be propagated down to these objects when the propagation configuration includes them[5]. Note that, since propagation ignores already cancelled shift demands and shifts, cancellation reset is never propagated from the job.

6.3 Shift to Closing Report Matching

When Shifts are created[6] or updated against a Job (`TR1__Job__c`), via their `s5m__BH4SFJob__c` field and with or without a `sirenum__ShiftDemand__c` set in them, they are matched to Closing Reports (`TR1__Closing_Report__c`) for the job and worker. This matching may cause a new closing report to be created or an existing one selected, but in either case the shift is updated to reference the relevant closing report, via the `s5m__BH4SFClosingReport__c` field.

This is implemented by the "`Shift to Closing Report Matching`" (`s5m.BH4SFShiftToClosingReport`) adaptive batch and disabling it (via the Adaptive Batch Settings record) will prevent any automated matching of shifts to closing reports and the automated creation of closing reports. This is not recommended.

The processing performed in the matching is controlled by the `sirenum__NamedSetting__mdt` custom metadata type record with API/Developer Name "`BH4SFShift_And_Closing_Report_Matching`". This is a JSON configuration

[5] This is the OOTB configured behaviour.

[6] This may be delayed until a specific Checkbox field in the shift becomes TRUE, depending on configuration.

document conforming to the http://sirenum.com/schema/2020/04/bh4sf-closing-report-to-shift-matching.json schema which defines:

- The record type that should be assigned to any auto-generated closing report.
- Any pairs of fields (between the shift and the closing report), over and above the job and worker, that must have matching values when selecting the appropriate closing report.
- Whether or not the closing reports' time domain[7] is relevant when matching the shift to a closing report. When it is relevant the optional extension values define by how much the closing report's time domain can be extended earlier (before the start) or later (after the end) before a new closing report must be created to cover the shift. In this scenario the job may have multiple closing reports, for a given worker, covering different parts of the job's own time domain.
- When a closing report is auto-generated, the definition of any additional non-matching fields that must be copied from the shift causing the generation to the new closing report.
- Optionally, the name of a Checkbox field within the `sirenum__Shift__c` that must be set TRUE before the shift will be matched to a closing report. This could, for example, be set to use `sirenum__Published__c` to only match the shift on publication.

The `s5m__AutoGenerated__c` field is set TRUE when a closing report is created by this logic. With the OOTB configuration, that closing report is given the record type "Shift Work", is matched only by job and worker, has no fields copied from the shift and is matched on shift creation/update. This behaviour may be changed or tailored via the configuration, or in the solution implementation, as required.

Note that updates to the shift may cause re-matching of the shift to a different closing report. This processing does not automatically delete a closing report that no longer has related shifts. Additionally, the relationship from the shift to the closing report will not change immediately and therefore may be stale for a short while. However, the shift's relationship field, `s5m__BH4SFClosingReport__c`, will change directly from the previous closing report to the revised one, thereby simplifying any additional processing required by the implementation at that point.

6.4 Automatic Generation of Shifts for Closing Reports

Where a Job's Shift Demand is set as Auto Fulfil, typically by inheriting this field from the Job itself, any Closing Reports for that Job that are themselves set as Auto Assign, have Shifts generated for them, linked to the Closing Report, its related Worker and the Shift Demand from which it is generated, until that Shift Demand is entirely fulfilled.

This is implemented by the "`BH4SF Shift generation for Demands`" (`s5m.BH4SFShiftGenerator`) adaptive batch and disabling it (via the Adaptive Batch Settings record) will prevent the automated creation of Shifts for unfulfilled,

[7] This is defined by the `TR1__Start_Date__c` and `TR1__End_Date__c` fields.

Auto-Fulfil Shift Demand/Auto-Assign Closing Report pairs. This is not recommended.

6.5 Automatic Publication (and Acceptance) of Closing Report Shifts

When Shifts are created for Closing Reports, perhaps via the functionality covered in section 6.4, once these have been processed by the Rule Engine and are found not to have any Fatal alerts, these Shifts are automatically published.

If the Closing Report is set as Accepted and the Shift is marked as Auto-Generated, it is set as Accepted at the same time.

This processing is implemented by the "`Publish Shifts for Closing Reports`" (`s5m.BH4SFPublishNewShiftsForClosingReports`) adaptive batch. Disabling this (via the Adaptive Batch Settings record) prevents the automatic publication (and acceptance) of such Shifts.

7 Appendix A – Product Features

7.1 Adaptive Batches

An Adaptive Batch is a special kind of Salesforce `Database.Batchable` that extends the `sirenum.AdaptiveBatch` API. The principles behind the Adaptive Batch are that:

- Only a single instance of the batch is ever executed at any one time.
- It processes its data set then looks to see if there is any new data to process and, if there is, it automatically re-schedules itself to run again after a short delay.
- It is "kicked" by the application when the application believes a data change has introduced new data for it to process.
- It can keep track of records in its data set that could not be successfully processed, for up to a specific number of executions of the batch, to ensure it doesn't re-schedule itself if the only data available likely cannot be processed successfully.
- The processing is always performed using the "Automated Process" user, making it easier to understand when automation is applying changes to data.

An adaptive batch is configured using a named Adaptive Batch Settings custom settings record; this provides the basic configuration for the adaptive batch:

- the batch "Chunk Size" (the number of records processed together in a single async transaction; this is constrained to be between 1 and 2000, inclusive).
- the "Bad Data Iterations" count (the maximum number of batch executions that specific records will be ignored for; this is constrained to be between 1 and 9999, inclusive).
- the "Interval", or minimum delay, in minutes between executions (this is constrained to be 1 or higher).
- the "Classname" for the Apex class to be run (this must identify a global class that extends the `sirenum.AdaptiveBatch` API).
- the "Enabled" status for the batch.

Disabling the adaptive batch, by unchecking the “Enabled” (`sirenum__Enabled__c`) field in the custom settings record or, more permanently, by deleting the custom settings record, will stop the batch’s continued processing once the current execution has completed.

The Adaptive Batch API is available for implementation by partners, as per the Sirenum API reference documentation. The “kicking” of the adaptive batch by the application can be done using the `sirenum.AdaptiveInvoker`, via Apex, or by publishing a `sirenum__AdaptiveBatchEvent__e` platform event from a flow or process builder. The conditions for “kicking” the adaptive batch should reflect the conditions applied by the Adaptive Batch itself, for optimal use of asynchronous executions. When publishing an event, it is optimal to only generate a single event in the current transaction to avoid wasting event publication limits.

7.2 Rate Cards Selection

This standard feature allows simple configuration of where Payroll Processing should look to locate the Rate Card(s) to be applied to a given Shift. This relies on a Plugin custom metadata type record with API/Developer Name “`Default_Rate_Cards_Selector`”. This plugin’s initial state accepts JSON conforming to the http://sirenum.com/schema/2020/04/rate-card-selector.json schema, allowing definition of the field paths, relative to the `sirenum__Shift__c` object, to be examined in the specified order for non-null Rate Card (`sirenum__Rate_Card__c`) record(s). When fallback through rate cards is required, the maximum number of rate cards that can be applied to a given Shift is 3.

If a custom rate card lookup field is added to the object model, the implementer simply needs to edit the JSON in this Plugin record to reference that field at the required point in the list to have payroll processing leverage that field when finding the rate card(s).

7.3 Competency Condition Constraints

Competency Conditions (`sirenum__Sirenum_Condition_Membership__c`) are used to identify the “Tickets” or Qualifications (`sirenum__Ticket__c`) that a Worker (Contact) must or should (not) have, to fulfil a given Shift. Each Competency Condition can define one or more values that constrain the selection of the Competency it represents by matching equivalent values on the Shift. When multiple constraining values are defined, the shift must match them all.

It is possible to define a new field (or “dimension”) on the Competency Condition that is to represent a new (typically optional) constraining value and to match this with some analogous existing or new field accessible on or through the shift (it may be a field path rather than field). However, to make use of these fields when matching conditions, it is necessary to configure a new Competency Condition Constraint.

Because this matching is potentially quite computationally expensive it is necessary to write specific Apex code. This code must implement the `sirenum.CompetencyConditionConstraint` API and then be registered via a Plugin custom metadata type record. The standard constraints are also registered in this way and can be disabled, as required, using the “Active” (`sirenum__Active__c`) field.

8 Appendix B – Supporting more than one Record Type for Shift Work

8.1 Overview

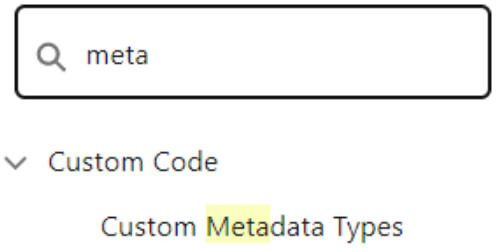
The OOTB processing of Closing Reports auto-generated from WFM Shifts uses a packaged record type of “Shift Work”. This appendix describes how this can be replaced to use the parent Job record type as the basis for setting the record type on the Closing Report.

The following steps are required to implement this:

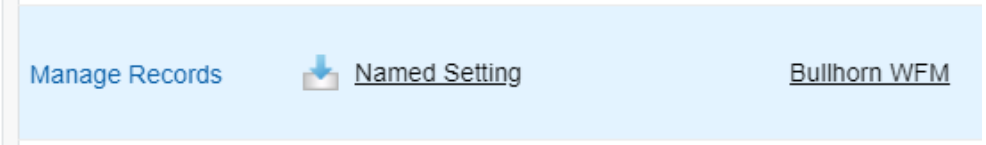
1. Update the named setting that causes the auto-generated Closing Report’s record type to be set to “Shift Work”.
2. Disable the `BH4SFCreateClosingReportForShiftWork` flow – this disablement is not strictly required as it currently only affects Closing Reports with the “Shift Work” record type but this may be fixed in the future to work for all Closing Reports auto-generated from Shifts, plus the relevant processing here is duplicated in the next step.
3. Create a custom flow to set the Closing Report’s record type based on the parent Job’s record type and replace the functionality of the now disabled `BH4SFCreateClosingReportForShiftWork` flow.
4. Allow WFM functionality to be exposed on the Job and Closing Report Lightning Record Pages by adjusting the conditional visibility.

8.2 Detailed Steps

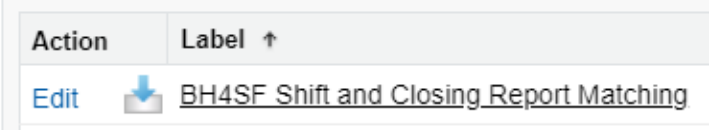
1. Remove the configuration in the Named Setting that sets the Closing Report record type to “Shift Work”:
   a. Navigate to Custom Metadata Types in Setup:



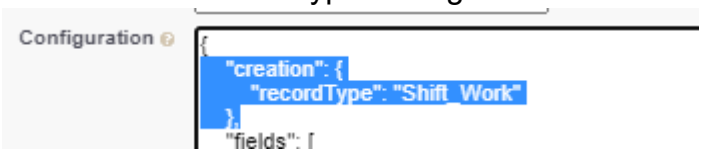
   b. Select Manage Records for Named Setting:



   c. Select Edit for BH4SF Shift and Closing Report Matching:

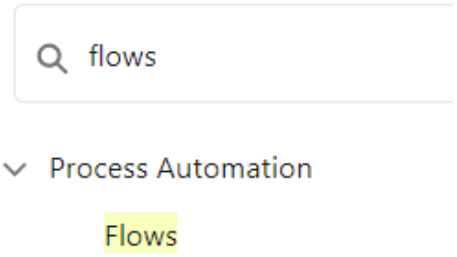


d. Remove the Record Type setting and save the Named Setting:

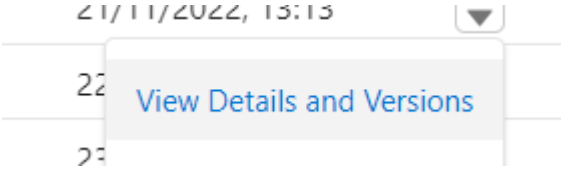


Note that if this leaves no other configuration ensure this is set to "{}".

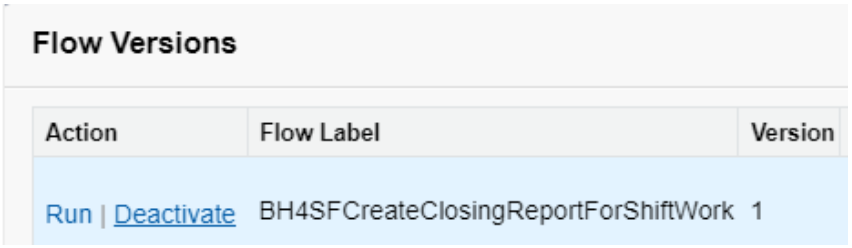
2. Disable the `BH4SFCreateClosingReportForShiftWork` flow:
   a. Navigate to Flows in Setup:



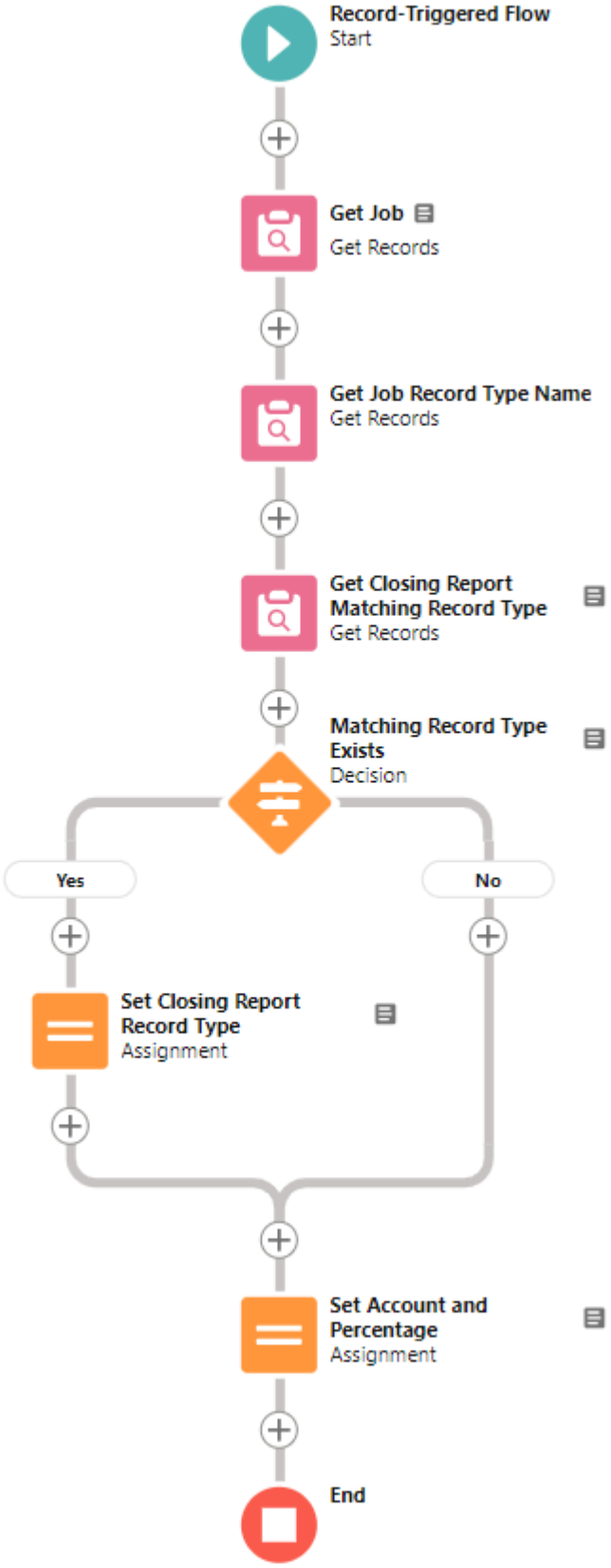
   b. Select View Details and Versions for the `BH4SFCreateClosingReportForShiftWork` flow:



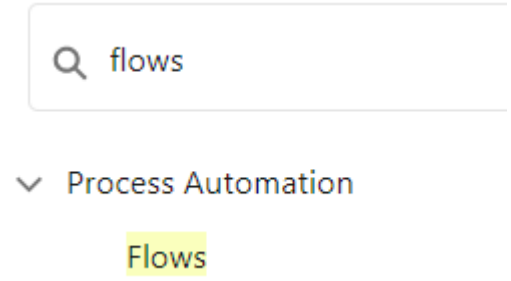
   c. Deactivate the flow:



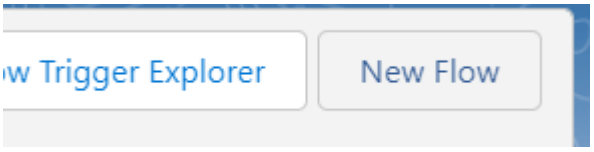
3. Create a custom flow:


Record-Triggered Flow
Start
Get Job
Get Records
Get Job Record Type Name
Get Records
Get Closing Report Matching Record Type
Get Records
Matching Record Type Exists
Decision
Yes
No
Set Closing Report Record Type
Assignment
Set Account and Percentage
Assignment
End

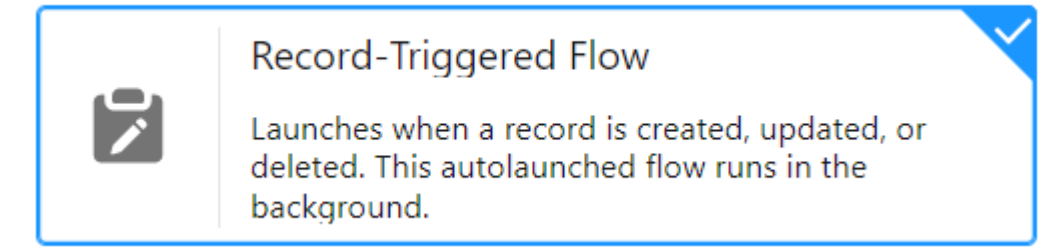
a. Navigate to Flows in Setup:



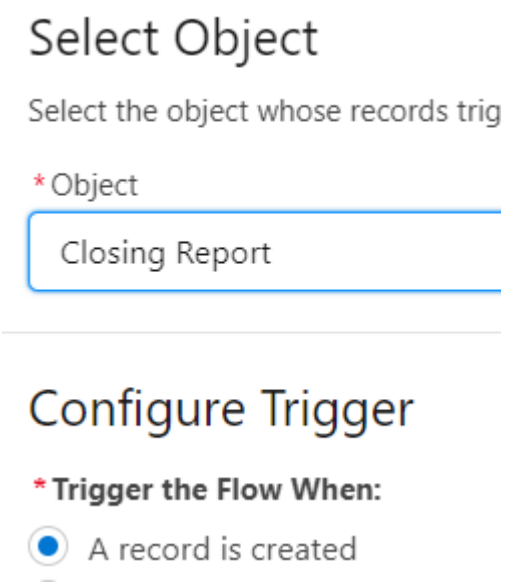
b. Select New Flow:



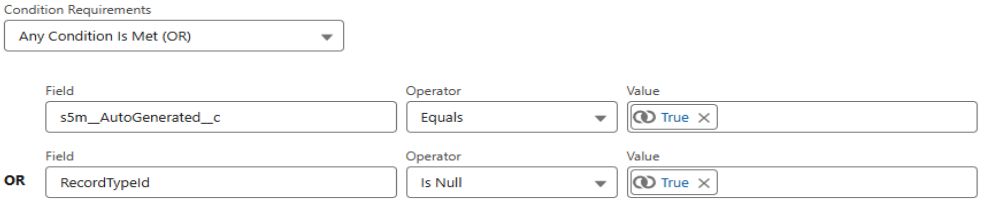
c. Create a Record Triggered flow:



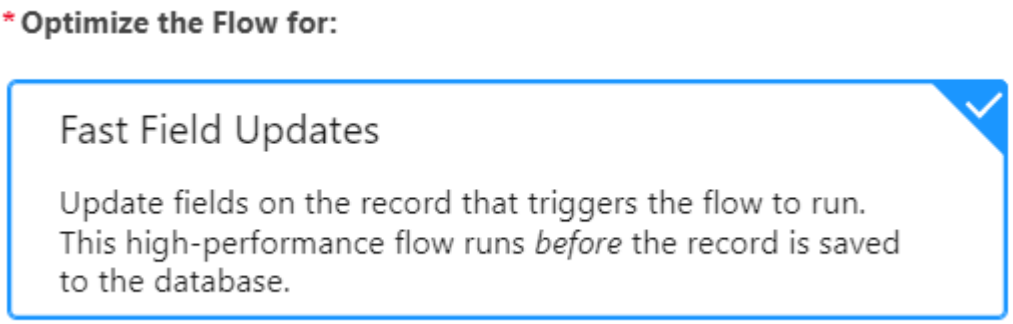
d. When a Closing Report is created:



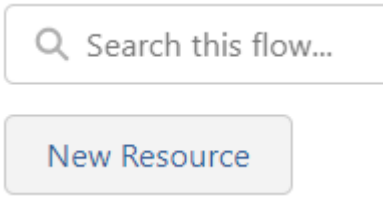
e. And `s5m_AutoGenerated__c` = True OR `RecordTypeId` is null:



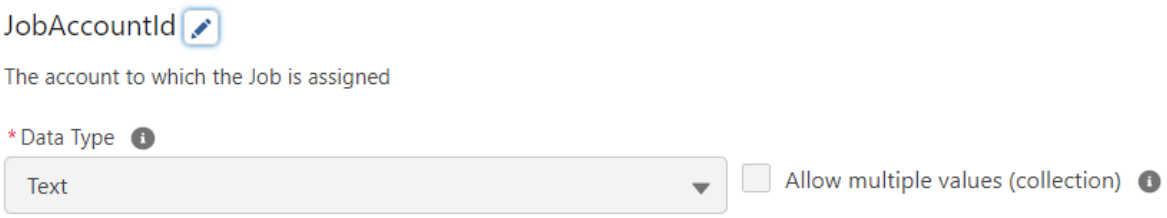
f. Optimize the flow for Fast Field updates:



g. Create a New Resource:



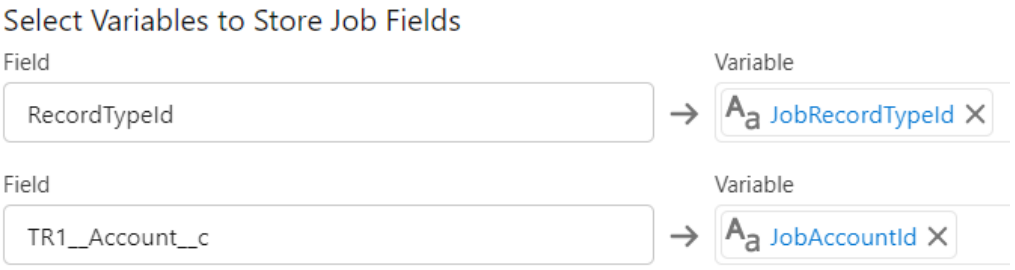
h. Create a text variable for `JobAccountId`:



i. Create text variables for:
   i. `JobRecordTypeId`
   ii. `JobRecordTypeName`
   iii. `ClosingReportRecordTypeId`

j. Create a “Get Records” element to get the Parent Job Record and store the Record Type Id and Account:
   i. Label: Get Job
   ii. Object: Job
   iii. All Conditions Are Met (AND)
      1. Id = $Record > Job
   iv. Not Sorted
   v. Only the first record
   vi. Choose fields and assign variables (advanced)

vii. In separate variables:

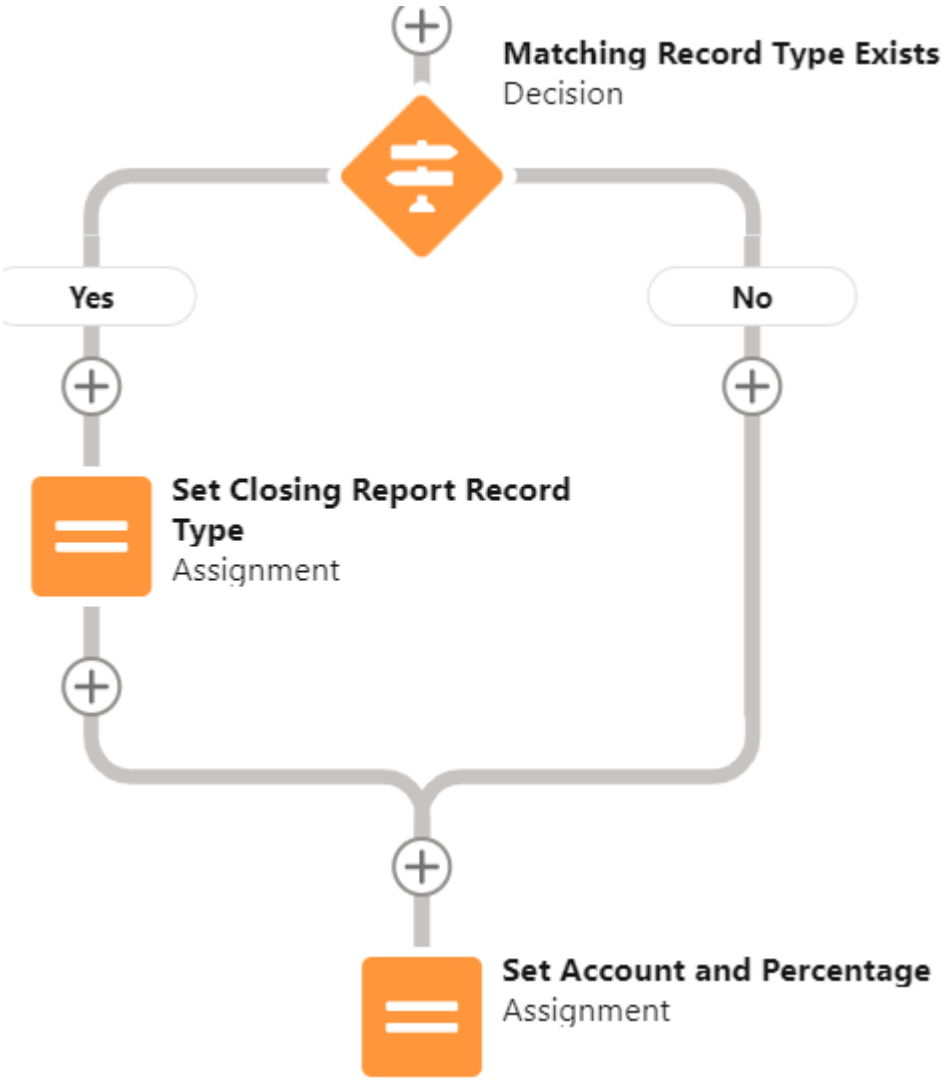


k. Create a "Get Records" element to get the corresponding Record Type Name:
   i. Label: Get Job Record Type Name
   ii. Object: Record Type
   iii. All Conditions Are Met (AND)
      1. Id = JobRecordTypeId
   iv. Not Sorted
   v. Only the first record
   vi. Choose fields and assign variables (advanced)
   vii. In separate variables:

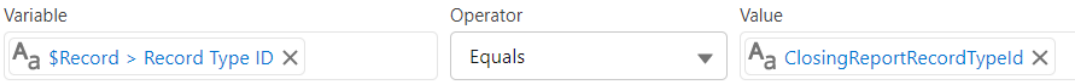
l. Create a "Get Records" element to get the corresponding Closing Report Record Type:
   i. Label: Get Closing Report Matching Record Type
   ii. Object: Record Type
   iii. All Conditions Are Met (AND)
      1. DeveloperName = JobRecordTypeName
      2. SobjectType = TR1__Closing_Report__c
   iv. Not Sorted
   v. Only the first record
   vi. Choose fields and assign variables (advanced)
   vii. In separate variables:

m. Create a "Decision" element:
   i. Label: Matching Record Type Exists
   ii. Outcome: Yes
   iii. All Conditions Are Met (AND)
      1. ClosingReportRecordTypeId IsNull = False

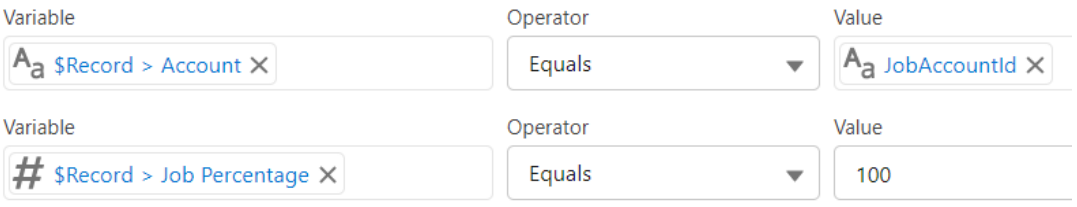
iv. Default Outcome: No



n. Create an “Assignment” element:
   i. Label: Set Closing Report Record Type
   ii. Set Variable Values:

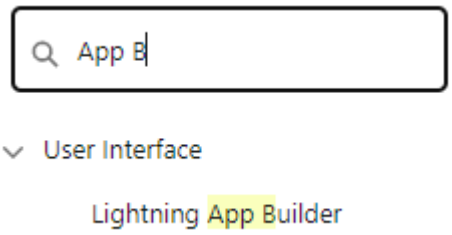


o. Create an “Assignment” element:
   i. Label: Set Account and Percentage
   ii. Set Variable Values:

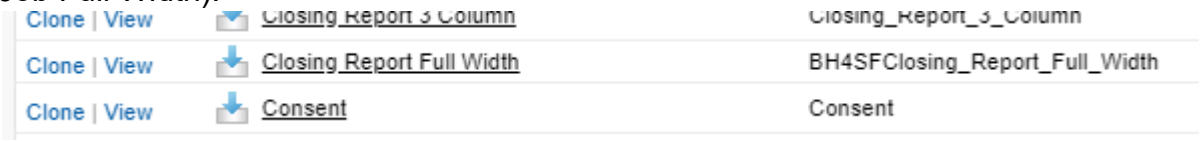


p. Ensure that the flow is activated.

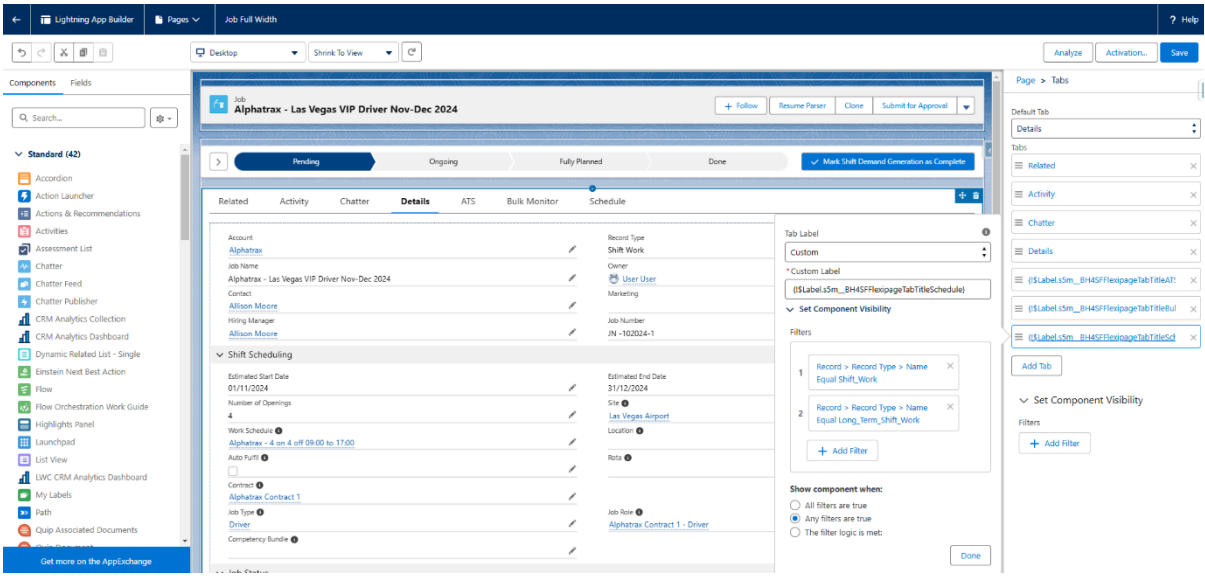
4. Update the Lightning Pages:
    a. Navigate to “Lightning App Builder”.



    b. Clone the required Lightning Page (e.g. Closing Report Full Width or Job Full Width).



    c. Edit the clone.
    d. Select the Schedule tab and update the tab visibility filter:



        i. Edit the filter to test the multiple Record Types (with “Any filters are true”) for which the tab should be displayed.
        NB: If using an older version of these lightning pages, remove the visibility filter from the Schedule component, delete the applicability message (below the Schedule component on the page) and delete the Worker Search tab before addressing this filter update.

    e. Save and activate these pages.

9 Appendix C – Using with the Connect for Salesforce Starter Kit

The Starter Kit provides support for:

- Shift-based Job Offers.

- Finding Shift-based work.

When using the Workforce Edition with Connect, it is likely that this should be configured to support:

- Shift- and Job-based Job Offers.
- Finding Job-based work.

The following steps are required to realize this setup:

1. Install the Starter Kit first. This allows deletion of the cross-object formula fields that the Starter Kit includes on Job Offers. Installing the Workforce Edition package first will block the installation of the Starter Kit package due to cross-object relationship limits.
2. After installing the Workforce Edition:
    a. Open the installed Connect digital experience and navigate to the Find Work page. Change the flow embedded in the page to “Find Jobs for Worker” (ensuring that the `recordId` input variable is populated using the expression “`{!contactId}`”) and republish the site.
    b. Download the `sds_BH4SFJob_Offer_Schedulable` configuration snippet (this is a static resource installed with the Workforce Edition) and use this to replace the `sirenum__Shift_Invitation__c` schedulable configuration in the “Connect Worker Schedule Tab (SK)” Schedule Definition (ideally using a schema aware editor such as VS Code; this will help identify any mistakes made).
    c. Ensure that either all Connect users **additionally** have the “Bullhorn Connect Worker (BH4SF)” permission set assigned to them or that the permission set used for such users includes read access to the various formula fields that the Workforce Edition adds to Job Offer as covered in section 4.5. *It may also be necessary to separately add permission to edit Job Offers if this has been removed from the SK permission set*.