Last Update: July 24, 2024

Enterprise Route Management

ERM Data Model

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1. Overview

This document contains details on the data model for the feature services used by the Enterprise Route Management (ERM) API and corresponding Route Planner web application.

* 1. System Fields

The following Esri system managed fields were excluded from the data model tables.

* OBJECTID
* Shape
* Shape\_Length
* Shape\_Area
* created\_user
* created\_date
* last\_edited\_user
* last\_edited\_date
  1. ERM Managed Fields

Many tables below have an “ERM” column to denote how the field is managed.

* Required
  + Field must have a valid value for functionality to work correctly.
* Optional
  + Can contain VRP parameters that are optional to use.
  + Can contain contextual description field that does not need to be filled in if not applicable for customer.
* Output – ERM manages this field and users should not change. These values may come from VRP during solve or the ERM API or Route Planner logic may populate.
  + All these fields should be set to editable=false by default in the web configuration.
  1. VRP Fields

Many tables below have VRP fields that show which Vehicle Routing Problem fields that the ERM fields map to during a Solve.

* VRP Class – VRP Class that field relates to
* VRP Field – Name of the field in VRP Class that the ERM field is mapped to.
  1. Document History

|  |  |  |
| --- | --- | --- |
| **Date** | **Description** | **Author** |
| 5/7/2021 | Doc creation based on Version 3.0 release schema | Mike Nelson |
| 7/13/2021 | Updates for Version 3.1 release | Mike Nelson |
| 8/18/2021 | Updates for Version 3.2 release | Mike Nelson |
| 1/10/2024 | Updates for Version 4.1 release  -removed ERM Solve Parameters section | Mike Nelson |
| 1/18/2024 | Updates for Version 4.2 release  -additional layers in ERM\_Plan\_Defaults | Mike Nelson |

1. ERM Plan Defaults

The ERM Plan Defaults service contains values to populate features on Plan creation.

* 1. DepotTemplate

Point feature layer that contains Depot location and information. A Dispatch Location can have multiple depots.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| curbapproach | Curb Approach | 2 | Short Integer | Requirement for how this location must be approached. Not Null small int. e.g. Either Side of Vehicle = 0, Right=2, Left=2, No-U-Turn + Either Side = 3 | Optional |
| depotname | Depot Name | 10 | String | Descriptive name of Depot | Optional |
| description | Description | 100 | String | Descriptive information for Depot location. e.g. address | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that locations relate to. Corresponds to key value set in DispatchLocation table | Required |
| timewindowend1 | Time Window End | 8 | Date | First time of day when this location closes | Optional |
| timewindowend2 | Time Window End 2 | 8 | Date | Second time of day when this location closes | Optional |
| timewindowstart1 | Time Window Start | 8 | Date | First time of day when this location opens | Optional |
| timewindowstart2 | Time Window Start 2 | 8 | Date | Second time of day when this location closes | Optional |
| timezone | Time Zone | 50 | String | Time zone descriptive local. E.g. "America/Los Angeles" in TZ Database format (https://en.wikipedia.org/wiki/Tz\_database) | Required |

* 1. DispatchLocation

Table that contains list of Dispatch Locations that a Plan can be created for.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| displocdesc | Dispatch Description | 50 | String | Descriptive information for Depot location. e.g. address | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location. This is key value that all other features must match when relating to a Dispatch Location | Required |
| timezone | Time Zone | 50 | String | Time zone descriptive local. E.g. "America/Los Angeles" in TZ Database format (https://en.wikipedia.org/wiki/Tz\_database) | Required |
| travelmode | Travel Mode | 128 | String | Defines the Travel Mode from Network Analysis that the location will use.  If using Solve Parameter tables, use the value “Custom” | Optional |

* 1. LineBarrierLibrary

Line barriers that can affect routing. More information can be found in [VRP online help](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/barriers.htm). Features are not required.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| barriertype | Barrier Type | 2 | Small Integer | The type of barrier. Currently only restriction type is implemented. | Optional |
| begindate | Begin Date | 8 | Date | Date that barrier starts | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that barrier relates to. Corresponds to key value set in DispatchLocation table | Required |
| enddate | End Date | 8 | Date | Date that barrier ends | Optional |
| impedancescale | Impedance Scale | 8 | Double |  |  |
| name | Barrier Name | 50 | String | Descriptive Name | Optional |

* 1. PointBarrierLibrary

Point barriers that can affect routing. More information can be found in [VRP online help](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/barriers.htm). Features are not required.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| additional\_distance | Additional Distance | 8 | Double | Distance to add onto Route if path goes through barrier | Optional |
| additional\_time | Additional Time | 8 | Double | Time to add onto Route if path goes through barrier | Optional |
| additionalcost | Additional Cost | 8 | Double | Cost to add onto Route if path goes through barrier | Optional |
| barriertype | Barrier Type | 2 | Small Integer | The type of barrier. Currently only restriction type is implemented. | Optional |
| begindate | Begin Date | 8 | Date | Date that barrier starts | Optional |
| curbapproach | Curb Approach | 2 | Short Integer | Requirement for how this location must be approached. Not Null small int. e.g. Either Side of Vehicle = 0, Right=2, Left=2, No-U-Turn + Either Side = 3 | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that barrier relates to. Corresponds to key value set in DispatchLocation table | Required |
| enddate | End Date | 8 | Date | Date that barrier ends | Optional |
| fulledge | Full Edge |  | Long Integer | This property is specific to restriction point barriers on edge elements | Optional |
| name | Name | 50 | String | Descriptive Name | Optional |

* 1. PolygonBarrierLibrary

Polygon barriers that can affect routing. More information can be found in [VRP online help](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/barriers.htm). Features are not required.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| name | Name | 50 | String | Descriptive Name | Optional |
| barriertype | Barrier Type | 2 | Small Integer | The type of barrier. Currently only restriction type is implemented. | Optional |
| begindate | Begin Date | 8 | Date | Date that barrier starts | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that barrier relates to. Corresponds to key value set in DispatchLocation table | Required |
| enddate | End Date | 8 | Date | Date that barrier ends | Optional |
| fulledge | Full Edge |  | Long Integer | This property is specific to restriction point barriers on edge elements | Optional |
| name | Name | 50 | String | Descriptive Name | Optional |
| scaledcostfactor | Scaled Cost Factor | 8 | Double | Factor used to add cost to the Route as it passes through the polygon barrier | Optional |
| scaleddistancefactor | Scaled Distance Factor | 8 | Double | Factor used to add distance to the Route as it passes through the polygon barrier | Optional |
| scaledtimefactor | Scaled Time Factor | 8 | Double | Factor used to add time to the Route as it passes through the polygon barrier | Optional |

* 1. RouteTemplate

Table that stores all information to create Routes for all Dispatch Locations.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| arrivedepartdelay | Arrive Depart Delay | 8 | Double | Delay time encountered at each stop this route makes. Minutes. Model is intended to support time it takes to park the vehicle, etc. Even if there is no model time to park the vehicle, set this parameter to an insignificant value. E.g. 0.01 | Optional |
| assignedto | Assigned To | 50 | String | The driver the route is assigned to. Route Planner populates this list with Portal usernames. If using Workforce must contain identity who will log into Workforce mobile app | Optional (Required if using Workforce) |
| assignmentrule | Assignment Rule |  | Long Integer | Rule for if this Route should be included or excluded during a solve | Required |
| capacitypieces | Capacity Pieces | 8 | Double | The maximum number of pieces the route can handle at one time | Required |
| capacityunits | Capacity Units | 8 | Double | The maximum number of units the route can handle at one time | Required |
| capacityvolume | Capacity Volume | 8 | Double | The maximum volume the route can handle at one time | Required |
| capacityweight | Capacity Weight | 8 | Double | The maximum weight the route can handle at one time | Required |
| description | Description | 50 | String | Freeform contextual description | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Route relates to. Corresponds to key value set in DispatchLocation table | Required |
| earlieststarttime | Earliest Start Time | 8 | Date | UTC time of the earliest this route may begin | Required |
| enddepotname | End Depot Name | 20 | String | Location that the Route ends at | Optional |
| enddepotservicetime | End Depot Service Time | 8 | Double | Time spent at end depot after return stem. | Optional |
| instructions | Instructions | 50 | String | Freeform contextual description |  |
| lateststarttime | Latest Start Time | 8 | Date | UTC time of the latest this Route may begin | Required |
| maxordercount | Max Order Count | 4 | Integer | Number of orders that can be assigned to a Route before the solver stops allocating new orders | Required |
| maxtotaldistance | Max Total Distance | 8 | Double | Total distance this route may travel | Optional |
| maxtotaltime | Max Total Time | 8 | Double | Total time in minutes that this route may operate from the start time | Optional |
| maxtotaltraveltime | Max Total Travel Time | 8 | Double | Total travel time this route may incur as total time minus wait, service, and break time | Optional |
| modelcostperunitdistance | Model Cost Per Unit Distance | 8 | Double | Cost to operate the route by unit distance. E.g. 1. | Required |
| modelcostperunitovertime | Model Cost Per Unit Overtime | 8 | Double | Cost for operating the route for each minute at an overtime rate | Optional |
| modelcostperunittime | Model Cost Per Unit Time | 8 | Double | Cost to operate the route by minute. E.g. 1. | Required |
| modelfixedcost | Model Fixed Cost | 8 | Double | Modeling cost to start a route. E.g. 100 to operate a truck and driver for the day - even if the driver only works 30 min and the truck does not move | Required |
| modelovertimestarttime | Model Overtime Start Time | 8 | Double | Elapsed time in minutes when route will start to incur overtime cost | Optional |
| reportcostperunitdistance | Report Cost Per Unit Distance | 8 | Double | Reporting Cost to operate the route by unit distance. This value is used for reporting. It is not used for internal objective function of the solve | Required |
| reportcostperunitovertime | Report Cost Per Unit Overtime | 8 | Double | Reporting Cost to operate the route by unit overtime. This value is used for reporting. It is not used for internal objective function of the solve | Required |
| reportcostperunittime | Report Cost Per Unit Time | 8 | Double | Reporting Cost to operate the route by unit time. This value is used for reporting. It is not used for internal objective function of the solve | Required |
| reportfixedcost | Report Fixed Cost | 8 | Double | Reporting Cost to start a route. Not used by objective function | Required |
| reportovertimestarttime | Report Overtime Start Time | 8 | Double | Reporting time to begin applying actual overtime costs | Optional |
| routename | Route Name | 128 | String | Descriptive Name. This is key value other features will use to relate to the Route | Required |
| specialtynames | Specialty Names | 100 | String | The types of Specialties the Route can support. Can have multiple values. | Optional |
| startdepotname | Start Depot Name | 20 | String | Origin Depot for Route. Must match a Dispatch Location name | Required |

* 1. SpecialtyNameTemplate

Table that lists out all Specialties available to all Dispatch Locations. Note that Specialty Name should not have spaces. This is a limitation of Vehicle Routing Problem.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Specialty relates to. Corresponds to key value set in DispatchLocation table | Required |
| specialtyname | Specialty Name | 50 | String | Descriptive name of Specialty | Required |

* 1. ZoneTemplate

Polygon layer that contains Zone geometries and attributes.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Zone relates to. Corresponds to key value set in DispatchLocation table | Required |
| ishardzone | Is Hard Zone | 2 | Small Integer | True/False if Zone is hard or soft | Required |
| routename | Route Name | 128 | String | Name of Route that Zone relates to. Corresponds to key value set in RouteTemplate layer | Required |

* 1. BreakTemplate

Table that contains values that deal with Breaks for drivers.

Note that Breaks has not been implemented into ERM yet, this is a placeholder for future functionality.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Break relates to. Corresponds to key value set in DispatchLocation table | Required |
| ispaid | Is Paid | 2 | Small Integer | Boolean, if break is paid | Required |
| maxcumulworktime | Max Total Work Time | 8 | Double | Constraint for invoking a break at max work time intervals | Optional |
| maxtraveltimebetweenbreaks | Max Travel Time Between Breaks | 8 | Double | Constraint for invoking a break at max travel time intervals | Optional |
| maxviolationtime | Max Violation Time | 8 | Double | Max time this break can be late | Optional |
| precedence | Precedence | 4 | Integer | Values to sequence the breaks of a given route. Breaks with a precedence value of 1 occur before those with a value of 2, and so on. All breaks must have a precedence value. The default value for this attribute is 1. | Optional |
| routename | Route Name | 128 | String | Name of Route that Break relates to. Corresponds to key value set in RouteTemplate layer | Required |
| servicetime | Service Time | 8 | Double | Duration in minutes this break will last | Required |
| timewindowend | Time Window End | 8 | Date | For a time-window break, this is the latest time it could be ongoing (UTC) | Optional |
| timewindowstart | Time Window Start | 8 | Date | For a time window break, this is the earliest time it could begin (UTC) | Optional |

* 1. GeoOrderTemplate

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| address | Address | 100 | String | Freeform contextual description | Optional |
| agentrevenue | Agent Revenue | 8 | Double | Freeform contextual description | Optional |
| appointmentcode | Appointment Code | 1 | String | Freeform contextual description | Optional |
| assignmentrule | Assignment Rule | 2 | Small Integer | Rule for how this order should be assigned to a route | Optional |
| city | City | 50 | String | Freeform contextual description | Optional |
| collectionname | Collection Name | 128 | String | Name of the collection that this order is a part of. Key value must match from Collection layer | Required |
| consignee | Consignee | 100 | String | Freeform contextual description | Optional |
| consigneenotes | Consignee Notes | 100 | String | Freeform contextual description | Optional |
| consigner | Consigner | 100 | String | Freeform contextual description | Optional |
| consignernotes | Consigner Notes | 100 | String | Freeform contextual description | Optional |
| corporaterevenue | Corporate Revenue | 8 | Double | Freeform contextual description | Optional |
| cumldistance | Total Distance | 8 | Double | Output. total travel distance to this stop from the commencement of travel from commencement of the route | Output |
| cumltime | Total Time | 8 | Double | Output. total time to this stop from the commencement of travel from commencement of the route | Output |
| cumltraveltime | Total Travel Time | 8 | Double | Output. total travel time to this stop from the commencement of travel from commencement of the route | Output |
| curbapproach | Curb Approach | 2 | Small Integer | Requirement for how this location must be approached | Optional |
| depotname | Depot Name | 10 | String | Depot where this order originates and/or terminates | Optional |
| destination | Destination | 50 | String | Freeform destination. Supply chain context. An order should terminate at the destination | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Order relates to. Corresponds to key value set in DispatchLocation table | Required |
| eta | ETA | 8 | Date | Output. Arrival time at this stop in UTC | Output |
| frompreviousdistance | Previous Distance | 8 | Double | Output. Elapsed travel distance to this stop from the commencement of travel from the prior stop | Output |
| fromprevtraveltime | Previous Travel Time | 8 | Double | Output. Elapsed travel time to this stop from the commencement of travel from the prior stop | Output |
| geoorder\_height | Height | 8 | Double | Height of this order for calculating capacity | Required |
| geoorder\_length | Length | 8 | Double | Length of this order for calculating capacity | Required |
| geoorder\_pieces | Pieces | 8 | Double | Number of pieces in this order for calculating capacity | Required |
| geoorder\_units | Units | 8 | Double | Number of Units of this order for calculating capacity | Required |
| geoorder\_volume | Volume | 8 | Double | Cubic volume in this order for calculating capacity | Required |
| geoorder\_weight | Weight | 8 | Double | Weight of this order for calculating capacity | Required |
| geoorder\_width | Width | 8 | Double | Width of this order for calculating capacity | Required |
| geoorderstate | GeoOrder State | 20 | String | Tracks state of the order [UNASSIGNED, ASSIGNED, LOCKED, IN\_PROGRESS, CANCELED, DECLINED, COMPLETED]. Set by ERM API | Output |
| hazmat | Haz Mat | 20 | String | Freeform contextual description | Optional |
| inboundarrivaltime | Inbound Arrival Time | 8 | Date | Date/time (in UTC) when this order is available for dispatch from depot | Optional |
| lastselectionstate | Last Selection State | 50 | String |  |  |
| loadid | Load Id | 25 | String | The load into which this order is grouped. Common across all GeoOrders in the load.  This is an optional implementation, to configure BSI to populate. | Optional |
| locationname | Location Name | 255 | String | Name of location stored in MDM\_Location. Set by RoutePlanner app when updating location | Output |
| maxtwviolation | Max Time Window Violation | 2 | Small Integer | Maximum time in minutes that this order service can be violated (late) for first time window | Required |
| modelrevenue | Model Revenue | 8 | Double | A revenue value used to declare the importance of servicing this order versus another order | Optional |
| orderdescription | Order Description | 256 | String | Freeform order description | Optional |
| orderid | Order Id | 128 | String | The order ID as globally unique within a given plan scope | Required |
| origin | Origin | 50 | String | Freeform origin description | Optional |
| outbounddeparturetime | Outbound Departure Time | 8 | Date | Date/time (in UTC) when this order must be delivered to depot | Optional |
| postalcode | Postal Code | 10 | String | Freeform contextual description | Optional |
| routeassigned | Route Assigned | 1 | String | Boolean if the order is assigned to a Route | Output |
| routename | Route Name | 128 | String | Name of Route that Order is assigned to. Corresponds to key value in Route layer. Will be blank if unassigned | Output |
| routerevenue | Route Revenue | 8 | Double | Freeform contextual description | Optional |
| servicecommitmentdate | Service Commitment Date | 8 | Date | Freeform contextual description | Optional |
| servicelevel | Service Level | 50 | String | Freeform contextual description | Optional |
| servicetime | Service Time | 8 | Double | Time in minutes (fractional) it is anticipated this order will take to complete service | Required |
| specialty | Specialty | 50 | String | Specialties required by this order's stop. Can have multiple assigned | Optional |
| state\_province | State/Province | 2 | String | Freeform contextual description | Optional |
| statecomment | State Comment | 3000 | String | Comment from Workforce Integration | Output |
| statelastupdated | State Last Updated | 8 | Date | Last update of geoorderstate. Calculated by ERM API | Output |
| stopsequence | Stop Sequence | 2 | Small Integer | sequence that orders assigned to a route will be delivered | Output |
| stoptype | Stop Type | 10 | String | Pickup or Delivery | Required |
| street | Street | 50 | String | Freeform contextual description | Optional |
| timezone | Time Zone | 50 | String | Time zone descriptive. Placeholder for future functionality. Time zone set in Depot feature. | Optional |
| transitnotes | Transit Notes | 100 | String | Freeform contextual description | Optional |
| twend1 | Time Window End | 8 | Date | First time of day when this order closes (UTC) | Optional |
| twend2 | Time Window End 2 | 8 | Date | Second time of day when this order closes (UTC) | Optional |
| twstart1 | Time Window Start | 8 | Date | First time of day when this order opens (UTC) | Optional |
| twstart2 | Time Window Start 2 | 8 | Date | Second time of day when this order opens (UTC) | Optional |
| unsolvedreason | Unsolved Reason | 255 | String | Reason given by VRP why the order was not assigned to a route during previous solve | Output |
| violationtime | Violation Time | 8 | Double | Time window violation | Output |
| waittime | Wait Time | 8 | Double | Time spent waiting at this stop for the time window to open | Output |

* 1. CollectionTemplate

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| collectionname | Collection Name | 128 | String | Name of this collection. This is key value that GeoOrder will use | Required |
| destination | Destination | 50 | String | Freeform contextual description | Required |
| destinationeta | Destination ETA | 8 | Date | Time this collection is expected to be arrived/available for loading onto P&D routes. UTC | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Collection relates to. Corresponds to key value set in DispatchLocation table | Required |
| dispatchinstructions | Dispatch Instructions | 100 | String | Freeform contextual description | Optional |
| earliestcommit | Earliest Commit | 8 | Date | Time of the earliest service commitment in this collection. UTC | Optional |
| finaldestination | Final Destination | 50 | String | Freeform contextual description | Optional |
| lastselectionstate | Last Selection State | 50 | String | Set by application in response to user selecting or deselecting a collection for inclusion in a plan | Output |
| localorders | Local Orders | 4 | Integer | Freeform count description | Optional |
| locationdescription | Location Description | 50 | String | Freeform description | Optional |
| origin | Origin | 50 | String | Freeform description | Optional |
| servicelevel | Service Level | 50 | String | Freeform description | Optional |
| totalorders | Total Orders | 4 | Integer | Freeform count description | Optional |

* 1. OrderPairTemplate

Table that contains relationship between Pickup and Delivery order pairs. Order Pairs are an optional implantation. If not using Order Pairs, this table can be left empty.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| firstordername | First Order Name | 128 | String | The OrderID of the first order in pair. This field represents the pickup. | Required |
| maxtransittime | Max Transit Time | 8 | Double | Max time this order can spend on a route from the time it's picked up to the time it's delivered | Optional |
| secondordername | Second Order Name | 128 | String | The OrderID of the second order in pair. This field represents the delivery. | Required |
| displocdesc | Dispatch Description | 100 | String | Descriptive information for Depot location. e.g. address | Optional |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Order relates to. Corresponds to key value set in DispatchLocation table | Required |

1. ERM Plan Template

The ERM Plan Template layer is used when a new Plan is created. Data from ERM\_Plan\_Defaults is loaded in, so many fields will be the same.

* 1. Collection

Table that contains all information for Collections for created Plan. These fields are what are available in the Collections tab in Route Planner. Alias can be overridden by setting in the web app configuration.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| collectionname | Collection Name | 128 | String | Name of this collection. This is key value that GeoOrder will use | Required |  |  |
| destination | Destination | 50 | String | Freeform contextual description | Required |  |  |
| destinationeta | Destination ETA | 8 | Date | Time this collection is expected to be arrived/available for loading onto P&D routes. UTC | Optional |  |  |
| dispatchinstructions | Dispatch Instructions | 100 | String | Freeform contextual description | Optional |  |  |
| earliestcommit | Earliest Commit | 8 | Date | Time of the earliest service commitment in this collection. UTC | Optional |  |  |
| finaldestination | Final Destination | 50 | String | Freeform contextual description | Optional |  |  |
| lastselectionstate | Last Selection State | 50 | String | Set by application in response to user selecting or deselecting a collection for inclusion in a plan | Output |  |  |
| localorders | Local Orders | 4 | Integer | Freeform count description | Optional |  |  |
| locationdescription | Location Description | 50 | String | Freeform description | Optional |  |  |
| origin | Origin | 50 | String | Freeform description | Optional |  |  |
| servicelevel | Service Level | 50 | String | Freeform description | Optional |  |  |
| totalorders | Total Orders | 4 | Integer | Freeform count description | Optional |  |  |

* 1. Collection\_Edits

Table stores whether the Collection has been edited by the user.

|  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| collectionname | Collection Name | 128 | String | Name of the Collection. Key value that will match Collection Name in Collections table | Output |
| is\_bsi\_edited | Is BSI Edited | 1 | String | Boolean if the Collection has been edited by the BSI | Output |

* 1. Depot

Point layer that contains geometry and attributes for all Depots for the selected Dispatch Location.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| curbapproach | Curb Approach | 2 | Small Integer | Requirement for how this location must be approached. Not Null small int. e.g. Either Side of Vehicle = 0, Right=2, Left=2, No-U-Turn + Either Side = 3 | Optional | Depot | CurbApproach |
| depotid | Depot ID | 128 | String | Generated from DepotName value from DepotTemplate layer on plan creation | Output |  |  |
| depotname | Depot Name | 10 | String | Common name for Depot as seen by user | Required | Depot | DepotName |
| description | Description | 100 | String | Descriptive information for dispatch location. e.g. address | Optional | Depot | Description |
| timewindowend1 | Time Window End | 8 | Date | First time of day when this location closes | Optional | Depot | TimeWindowEnd1 |
| timewindowend2 | Time Window End 2 | 8 | Date | Second time of day when this location closes | Optional | Depot | TimeWindowEnd2 |
| timewindowstart1 | Time Window Start | 8 | Date | First time of day when this location opens | Optional | Depot | TimeWindowStart1 |
| timewindowstart2 | Time Window Start 2 | 8 | Date | Second time of day when this location opens | Optional | Depot | TimeWindowStart2 |
| timezone | Time Zone | 50 | String | Time zone descriptive local. E.g. "America/Los Angeles" in TZ Database format (https://en.wikipedia.org/wiki/Tz\_database) | Required |  |  |

* 1. DepotVisit

Point features populated during Solve to represent a truck arriving or departing a depot. This layer is completely managed by ERM.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| arrivetime | Arrival Time | 8 | Date | Arrival time at location in UTC | Output |  |  |
| cumuldistance | Total Distance | 8 | Double | Currently not used | Output |  |  |
| cumultime | Total Time | 8 | Double | Currently not used | Output |  |  |
| cumultraveltime | Total Travel Time | 8 | Double | Currently not used | Output |  |  |
| cumulviolationtime | Total Violation Time | 8 | Double | Currently not used | Output |  |  |
| cumulwaittime | Total Wait Time | 8 | Double | Currently not used | Output |  |  |
| departtime | Depart Time | 8 | Date | Departure time from location in UTC | Output |  |  |
| depotname | Depot Name | 128 | String | Depot name that visit is occurring at | Output |  |  |
| fromprevdistance | Previous Distance | 8 | Double | Total distance the truck has traveled to the point of the visit. | Output |  |  |
| fromprevtraveltime | Previous Travel Time | 8 | Double | Total time the truck has traveled to the point of the visit. | Output |  |  |
| routename | Route Name | 128 | String | Name of Route that Depot Visit relates to. Corresponds to key value in Route layer | Output |  |  |
| stopsequence | Stop Sequence | 4 | Integer | The sequence in the overall route that visit occurs. | Output |  |  |
| servicetime | Service Time | 8 | Double | Currently not used | Output |  |  |
| totalloadedquantities | Total Loaded Quantities | 128 | String | Currently not used | Output |  |  |
| totalunloadedquantities | Total Unloaded Quantities | 128 | String | Currently not used | Output |  |  |
| visittype | Visit Type | 4 | Integer | Currently not used | Output |  |  |
| waittime | Wait Time | 8 | Double | How long truck spent at the depot during visit | Output |  |  |

* 1. GeoOrder

Point feature representing every Order in the Plan. Information is initially populated from the BSI during Plan creation. These fields are what are available in the Assigned and Unassigned Orders tables in Route Planner. Alias can be overridden by setting in the web app configuration.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| address | Address | 100 | String | Freeform contextual description | Optional |  |  |
| agentrevenue | Agent Revenue | 8 | Double | Freeform contextual description | Optional |  |  |
| appointmentcode | Appointment Code | 1 | String | Freeform contextual description | Optional |  |  |
| assignmentrule | Assignment Rule | 2 | Small Integer | Rule for how this order should be assigned to a route | Optional | Orders | AssignmentRule |
| city | City | 50 | String | Freeform contextual description | Optional |  |  |
| collectionname | Collection Name | 128 | String | Name of the collection that this order is a part of. Key value must match from Collection layer | Required |  |  |
| consignee | Consignee | 100 | String | Freeform contextual description | Optional |  |  |
| consigneenotes | Consignee Notes | 100 | String | Freeform contextual description | Optional |  |  |
| consigner | Consigner | 100 | String | Freeform contextual description | Optional |  |  |
| consignernotes | Consigner Notes | 100 | String | Freeform contextual description | Optional |  |  |
| corporaterevenue | Corporate Revenue | 8 | Double | Freeform contextual description | Optional |  |  |
| cumldistance | Total Distance | 8 | Double | Output. total travel distance to this stop from the commencement of travel from commencement of the route | Output |  |  |
| cumltime | Total Time | 8 | Double | Output. total time to this stop from the commencement of travel from commencement of the route | Output |  |  |
| cumltraveltime | Total Travel Time | 8 | Double | Output. total travel time to this stop from the commencement of travel from commencement of the route | Output |  |  |
| curbapproach | Curb Approach | 2 | Small Integer | Requirement for how this location must be approached | Optional | Orders | CurbApproach |
| depotname | Depot Name | 10 | String | Depot where this order originates and/or terminates | Optional |  |  |
| destination | Destination | 50 | String | Freeform destination. Supply chain context. An order should terminate at the destination | Optional |  |  |
| displocdesc | Dispatch Description | 100 | String | Descriptive information for Depot location. e.g. address | Optional |  |  |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Order relates to. Corresponds to key value set in DispatchLocation table | Required |  |  |
| eta | ETA | 8 | Date | Output. Arrival time at this stop in UTC | Output | Orders | ArriveTimeUTC |
| frompreviousdistance | Previous Distance | 8 | Double | Output. Elapsed travel distance to this stop from the commencement of travel from the prior stop | Output | Orders | FromPrevDistance |
| fromprevtraveltime | Previous Travel Time | 8 | Double | Output. Elapsed travel time to this stop from the commencement of travel from the prior stop | Output | Orders | FromPrevTravelTime |
| geoorder\_height | Height | 8 | Double | Height of this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorder\_length | Length | 8 | Double | Length of this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorder\_pieces | Pieces | 8 | Double | Number of pieces in this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorder\_units | Units | 8 | Double | Number of Units of this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorder\_volume | Volume | 8 | Double | Cubic volume in this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorder\_weight | Weight | 8 | Double | Weight of this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorder\_width | Width | 8 | Double | Width of this order for calculating capacity | Required | Orders | DeliveryQuantities (all quantities passed in single parameter) |
| geoorderstate | GeoOrder State | 20 | String | Tracks state of the order [UNASSIGNED, ASSIGNED, LOCKED, IN\_PROGRESS, CANCELED, DECLINED, COMPLETED]. Set by ERM API | Output |  |  |
| hazmat | Haz Mat | 20 | String | Freeform contextual description | Optional |  |  |
| inboundarrivaltime | Inbound Arrival Time | 8 | Date | Date/time (in UTC) when this order is available for dispatch from depot | Optional | Orders | InboundArriveTime |
| lastselectionstate | Last Selection State | 50 | String |  |  |  |  |
| loadid | Load Id | 25 | String | The load into which this order is grouped. Common across all GeoOrders in the load.  This is an optional implementation, to configure BSI to populate. | Optional |  |  |
| locationname | Location Name | 255 | String | Name of location stored in MDM\_Location. Set by RoutePlanner app when updating location | Output |  |  |
| maxtwviolation | Max Time Window Violation | 2 | Small Integer | Maximum time in minutes that this order service can be violated (late) for first time window | Required | Orders | MaxViolationTime1 |
| modelrevenue | Model Revenue | 8 | Double | A revenue value used to declare the importance of servicing this order versus another order | Optional | Orders | Revenue |
| orderdescription | Order Description | 256 | String | Freeform order description | Optional | Orders | Description |
| orderid | Order Id | 128 | String | The order ID as globally unique within a given plan scope | Required | Orders | Name |
| origin | Origin | 50 | String | Freeform origin description | Optional |  |  |
| outbounddeparturetime | Outbound Departure Time | 8 | Date | Date/time (in UTC) when this order must be delivered to depot | Optional | Orders | OutboundDepartTime |
| postalcode | Postal Code | 10 | String | Freeform contextual description | Optional |  |  |
| routeassigned | Route Assigned | 1 | String | Boolean if the order is assigned to a Route | Output |  |  |
| routename | Route Name | 128 | String | Name of Route that Order is assigned to. Corresponds to key value in Route layer. Will be blank if unassigned | Output | Orders | RouteName |
| routerevenue | Route Revenue | 8 | Double | Freeform contextual description | Optional |  |  |
| servicecommitmentdate | Service Commitment Date | 8 | Date | Freeform contextual description | Optional |  |  |
| servicelevel | Service Level | 50 | String | Freeform contextual description | Optional |  |  |
| servicetime | Service Time | 8 | Double | Time in minutes (fractional) it is anticipated this order will take to complete service | Required | Orders | ServiceTime |
| specialty | Specialty | 50 | String | Specialties required by this order's stop. Can have multiple assigned | Optional | Orders | SpecialtyNames |
| state\_province | State/Province | 2 | String | Freeform contextual description | Optional |  |  |
| statecomment | State Comment | 3000 | String | Comment from Workforce Integration | Output |  |  |
| statelastupdated | State Last Updated | 8 | Date | Last update of geoorderstate. Calculated by ERM API | Output |  |  |
| stopsequence | Stop Sequence | 2 | Small Integer | sequence that orders assigned to a route will be delivered | Output | Orders | Sequence |
| stoptype | Stop Type | 10 | String | Pickup or Delivery | Required |  |  |
| street | Street | 50 | String | Freeform contextual description | Optional |  |  |
| timezone | Time Zone | 50 | String | Time zone descriptive. Placeholder for future functionality. Time zone set in Depot feature. | Optional |  |  |
| transitnotes | Transit Notes | 100 | String | Freeform contextual description | Optional |  |  |
| twend1 | Time Window End | 8 | Date | First time of day when this order closes (UTC) | Optional | Orders | TimeWindowEnd1 |
| twend2 | Time Window End 2 | 8 | Date | Second time of day when this order closes (UTC) | Optional | Orders | TimeWindowEnd2 |
| twstart1 | Time Window Start | 8 | Date | First time of day when this order opens (UTC) | Optional | Orders | TimeWindowStart1 |
| twstart2 | Time Window Start 2 | 8 | Date | Second time of day when this order opens (UTC) | Optional | Orders | TimeWindowStart2 |
| unsolvedreason | Unsolved Reason | 255 | String | Reason given by VRP why the order was not assigned to a route during previous solve | Output |  |  |
| violationtime | Violation Time | 8 | Double | Time window violation | Output | Orders | ViolationTime |
| waittime | Wait Time | 8 | Double | Time spent waiting at this stop for the time window to open | Output | Orders | WaitTime |

* 1. GeoOrder\_Edits

Table stores information on what edits have been made to Orders so that Refresh will not overwrite changes a user has made.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| address | Address | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| agentrevenue | Agent Revenue | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| assignmentrule | Assignment Rule | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| city | City | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| consignee | Consignee | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| consigneenotes | Consignee Notes | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| consigner | Consigner | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| consignernotes | Consigner Notes | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| corporaterevenue | Corporate Revenue | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_height | Height | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_length | Length | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_pieces | Pieces | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_units | Units | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_volume | Volume | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_weight | Weight | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| geoorder\_width | Width | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| hazmat | Haz Mat | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| is\_bsi\_edited | Is BSI Edited | 1 | String | Boolean if the BSI has edited this feature in GeoOrder layer | Output |
| locationname | Location Name | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| maxtwviolation | Max Time Window Violation | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| orderdescription | Order Description | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| orderid | Order Id | 128 | String | OrderID key value that relates edits to GeoOrder layer | Output |
| postalcode | Postal Code | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| servicelevel | Service Level | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| servicetime | Service Time | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| specialty | Specialty | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| state\_province | State/Province | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| street | Street | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| transitnotes | Transit Notes | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| twend1 | Time Window End | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| twend2 | Time Window End 2 | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| twstart1 | Time Window Start | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| twstart2 | Time Window Start 2 | 1 | String | Boolean if user has edited this field in GeoOrder layer | Output |
| x | X | 1 | String | Boolean if user has edited the Location of the feature in GeoOrder layer | Output |
| y | Y | 1 | String | Boolean if user has edited the Location of the feature in GeoOrder layer | Output |

* 1. LineBarrier

Line features that add restrictions on routing path.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| name | Name | 50 | String | Descriptive Name | Optional |  |  |

* 1. OrderPair

Table that contains relationship between Pickup and Delivery order pairs. Order Pairs are an optional implantation. If not using this table can be left empty.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| firstordername | First Order Name | 128 | String | The OrderID of the first order in pair. This field represents the pickup. | Required | Order Pairs | FirstOrderName |
| maxtransittime | Max Transit Time | 8 | Double | Max time this order can spend on a route from the time it's picked up to the time it's delivered | Optional | Order Pairs | MaxTransitTime |
| secondordername | Second Order Name | 128 | String | The OrderID of the second order in pair. This field represents the delivery. | Required | Order Pairs | SecondOrderName |

* 1. PlanMetadata

Table that stores information about the Plan.

| **Name** | **Alias** | **Length** | **Type** | | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- | --- |
| displocname | Dispatch Location | 10 | | String | Name of Dispatch Location that Plan created for. Corresponds to key value set in DispatchLocation table | Output |
| fullsolvecount | Full Solve Count | 4 | | Integer | Cumulative number of solves invoked by users | Output |
| lastsolvevrp | Last Solve VRP | 0 | | Blob | Currently not used |  |
| moveorderscount | Move Orders Count | 4 | | Integer | Currently not used |  |
| orderrevenue | Order Revenue | 8 | | Double | Revenue as sum | Output |
| planningcutofftime | Planning Cutoff Time | 8 | | Date | Cutoff time specified by user at Plan creation. UTC | Output |
| planworkflowevent | Plan Workflow Event | 10 | | String |  |  |
| refresh\_timestamp | Refresh Timestamp | 8 | | Date | When this plan was last refreshed with the BSI | Output |
| routesactivated | Routes Activated | 4 | | Integer | Total number of routes used in plan | Output |
| solutioncost | Solution Cost | 8 | | Double | Total cost of the solution (reporting cost) | Output |
| stopsassigned | Stops Assigned | 4 | | Integer | Number of orders assigned to all routes. Includes Route visits. | Output |
| timezone | TimeZone | 50 | | String | Time zone descriptive local. E.g. "America/Los Angeles" in TZ Database format (https://en.wikipedia.org/wiki/Tz\_database) | Output |
| totaldistance | Total Distance | 8 | | Double | Total distance of all routes activated in this plan | Output |
| totaltime | Total Time | 8 | | Double | Total time used by all routes activated in this plan | Output |
| unassignedorders | Unassigned Orders | 4 | | Integer | Number of orders unassigned | Output |

* 1. PointBarrierLibrary

Point barriers that can affect routing. More information can be found in [VRP online help](https://desktop.arcgis.com/en/arcmap/latest/extensions/network-analyst/barriers.htm). Features are not required.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** |
| --- | --- | --- | --- | --- | --- |
| additional\_distance | Additional Distance | 8 | Double | Distance to add onto Route if path goes through barrier | Optional |
| additional\_time | Additional Time | 8 | Double | Time to add onto Route if path goes through barrier | Optional |
| additionalcost | Additional Cost | 8 | Double | Cost to add onto Route if path goes through barrier | Optional |
| barriertype | Barrier Type | 2 | Small Integer | The type of barrier. Currently only restriction type is implemented. | Optional |
| curbapproach | Curb Approach | 2 | Short Integer | Requirement for how this location must be approached. Not Null small int. e.g. Either Side of Vehicle = 0, Right=2, Left=2, No-U-Turn + Either Side = 3 | Optional |
| fulledge | Full Edge |  | Long Integer | This property is specific to restriction point barriers on edge elements | Optional |
| name | Name | 50 | String | Descriptive Name | Optional |

* 1. PolygonBarrier

Polygon features that add restrictions on routing path.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| barriertype | Barrier Type | 2 | Small Integer | The type of barrier. Currently only restriction type is implemented. | Optional |  |  |
| name | Name | 50 | String | Descriptive Name | Optional |  |  |
| scaledcostfactor | Scaled Cost Factor | 8 | Double | Factor used to add cost to the Route as it passes through the polygon barrier | Optional |  |  |
| scaleddistancefactor | Scaled Distance Factor | 8 | Double | Factor used to add distance to the Route as it passes through the polygon barrier | Optional |  |  |
| scaledtimefactor | Scaled Time Factor | 8 | Double | Factor used to add time to the Route as it passes through the polygon barrier | Optional |  |  |

* 1. Route

Line feature layer representing Routes available in the Plan. These fields are what are available in the Routes tab in Route Planner. Alias can be overridden by setting in the web app configuration.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| arrivedepartdelay | Arrive Depart Delay | 8 | Double | Delay time encountered at each stop this route makes. Minutes. Model is intended to support time it takes to park the vehicle, etc. Even if there is no model time to park the vehicle, set this parameter to an insignificant value. E.g. 0.01 | Optional | Routes | ArriveDepartDelay |
| assignedto | Assigned To | 50 | String | The driver the route is assigned to. Route Planner populates this list with Portal usernames. If using Workforce must contain identity who will log into Workforce mobile app | Required if using Workforce |  |  |
| assignmentrule | Assignment Rule | 2 | Small Integer | Rule for if this Route should be included or excluded during a solve | Required | Routes | AssignmentRule |
| capacityheight | Capacity Height | 8 | Double | The maximum height the route can handle at one time | Required |  |  |
| capacitylength | Capacity Length | 8 | Double | The maximum length the route can handle at one time | Required |  |  |
| capacitypieces | Capacity Pieces | 8 | Double | The maximum number of pieces the route can handle at one time | Required | Routes | Capacities (all capacities passed in one parameter) |
| capacityunits | Capacity Units | 8 | Double | The maximum number of units the route can handle at one time | Required | Routes | Capacities (all capacities passed in one parameter) |
| capacityvolume | Capacity Volume | 8 | Double | The maximum volume the route can handle at one time | Required | Routes | Capacities (all capacities passed in one parameter) |
| capacityweight | Capacity Weight | 8 | Double | The maximum weight the route can handle at one time | Required | Routes | Capacities (all capacities passed in one parameter) |
| capacitywidth | Capacity Width | 8 | Double | The maximum width the route can handle at one time | Required |  |  |
| currentorders | Current Orders | 4 | Integer | Count that is dynamically updated as Orders are assigned/removed. Independent of Solve | Output |  |  |
| currentpieces | Current Pieces | 8 | Double | Count that is dynamically updated to show total number of Pieces of all Orders currently assigned to Route | Output |  |  |
| currentunits | Current Units | 8 | Double | Currently not used | Output |  |  |
| currentvolume | Current Volume | 8 | Double | Currently not used | Output |  |  |
| currentweight | Current Weight | 8 | Double | Count that is dynamically updated to show total Weight of all Orders currently assigned to Route | Output |  |  |
| description | Description | 100 | String | Freeform contextual description | Optional |  |  |
| displaydistancecost | Distance Cost | 8 | Double | ERM calculated field on Solve: VRP Total Distance \* Report Cost Per Unit Distance | Output |  |  |
| displayovertimecost | Overtime Cost | 8 | Double | ERM calculated field on Solve: (VRP Overtime Cost / Model Cost Per Unit Overtime) \* Report Cost Per Unit Overtime | Output |  |  |
| displayregulartimecost | Regular Time Cost | 8 | Double | ERM calculated field on Solve: (VRP Regular Time Cost / Model Cost Per Unit Time) \* Report Cost Per Unit Time | Output |  |  |
| displaytotalcost | Total Cost | 8 | Double | ERM calculated field on Solve: RegularTimeCost + DistanceCost + OvertimeCost + Report Fixed Cost | Output |  |  |
| distancecost | VRP Distance Cost | 8 | Double | Total distance cost from VRP | Output | Routes | DistanceCost |
| earlieststarttime | Earliest Start Time | 8 | Date | UTC time of the earliest this route may begin | Required |  |  |
| enddepotid | End Depot Id | 128 | String | Currently not used |  |  |  |
| enddepotname | End Depot Name | 10 | String | Location that the Route ends at | Optional |  |  |
| enddepotservicetime | End Depot Service Time | 8 | Double | Time spent at end depot after return stem. | Optional |  |  |
| endtime | End Time | 8 | Date | The time route was ended by the solver UTC | Output | Routes | EndTimeUTC |
| inprogress | In Progress | 1 | String | Boolean. Used with Workforce and dynamic planning to denote if work has begun on Route | Output |  |  |
| instructions | Instructions | 50 | String | Freeform contextual description | Optional |  |  |
| isvalid | Route Valid | 1 | String | Boolean, if Route was successfully Solved | Optional |  |  |
| lateststarttime | Latest Start Time | 8 | Date | UTC time of the latest this Route may begin | Required | Routes | LatestStartTime |
| maxordercount | Max Order Count | 2 | Small Integer | Number of orders that can be assigned to a Route before the solver stops allocating new orders | Required | Routes | MaxOrderCount |
| maxtotaldistance | Max Total Distance | 8 | Double | Total distance this route may travel | Optional | Routes | MaxTotalDistance |
| maxtotaltime | Max Total Time | 8 | Double | Total time in minutes that this route may operate from the start time | Optional | Routes | MaxTotalTime |
| maxtotaltraveltime | Max Total Travel Time | 8 | Double | Total travel time this route may incur as total time minus wait, service, and break time | Optional | Routes | MaxTotalTravelTime |
| modelcostperunitdistance | Model Cost Per Unit Distance | 8 | Double | Cost to operate the route by unit distance. E.g. 1. | Required | Routes | CostPerUnitDistance |
| modelcostperunitovertime | Model Cost Per Unit Overtime | 8 | Double | Cost for operating the route for each minute at an overtime rate | Optional | Routes | CostPerUnitOvertime |
| modelcostperunittime | Model Cost Per Unit Time | 8 | Double | Cost to operate the route by minute. E.g. 1. | Required | Routes | CostPerUnitTime |
| modelfixedcost | Model Fixed Cost | 8 | Double | Modeling cost to start a route. E.g. 100 to operate a truck and driver for the day - even if the driver only works 30 min and the truck does not move | Required | Routes | FixedCost |
| modelovertimestarttime | Model Overtime Start Time | 8 | Double | Elapsed time in minutes when route will start to incur overtime cost | Optional | Routes | OvertimeStartTime |
| nextstoptype | Next Stop Type | 10 | String | If next stop is a Pickup or Delivery. Used with Workforce and dynamic planning | Output |  |  |
| ordercount | Solved Orders | 2 | Small Integer | Number of Orders assigned to the Route during the last Solve | Output |  |  |
| overtimecost | VRP Overtime Cost | 8 | Double | Total overtime cost | Output | Routes | OvertimeCost |
| regulartimecost | VRP Regular Time Cost | 8 | Double | Total regular time cost | Output | Routes | RegularTimeCost |
| renewalcount | Renewal Count | 2 | Small Integer | Number of times the route renewed at a depot | Output | Routes | RenewalCount |
| reportcostperunitdistance | Report Cost Per Unit Distance | 8 | Double | Reporting Cost to operate the route by unit distance. This value is used for reporting. It is not used for internal objective function of the solve | Required |  |  |
| reportcostperunitovertime | Report Cost Per Unit Overtime | 8 | Double | Reporting Cost to operate the route by unit overtime. This value is used for reporting. It is not used for internal objective function of the solve | Required |  |  |
| reportcostperunittime | Report Cost Per Unit Time | 8 | Double | Reporting Cost to operate the route by unit time. This value is used for reporting. It is not used for internal objective function of the solve | Required |  |  |
| reportfixedcost | Report Fixed Cost | 8 | Double | Reporting Cost to start a route. Not used by objective function | Required |  |  |
| reportovertimestarttime | Report Overtime Start Time | 8 | Double | Reporting time to begin applying actual overtime costs | Optional |  |  |
| routealias | Route Alias | 128 | String | User editable descriptive name of the route | Optional |  |  |
| routename | Route Name | 128 | String | Non-editable name of the route used for internal relationships. This is key value all other layers should use for Route Name | Required | Routes | Name |
| routestate | Route State | 20 | String | Current state of Route: Unsolved, Solved, Committed, Blank. Blank denotes no action has been taken on Route since Plan creation | Output |  |  |
| specialtynames | Specialty Names | 100 | String | The types of Specialties the Route can support. Can have multiple values. | Optional | Routes | SpecialtyNames |
| startdepotid | Start Depot Id | 128 | String | Currently not used |  |  |  |
| startdepotname | Start Depot Name | 10 | String | Origin Depot for Route. Must match a Dispatch Location name | Required | Routes | StartDepotName |
| startdepotservicetime | Start Depot Service Time | 8 | Double | Time spent at begin depot before beginning travel | Optional | Routes | StartDepotServiceTime |
| starttime | Start Time | 8 | Date | Time route was started by the solver. UTC | Output | Routes | StartTimeUTC |
| totalbreakservicetime | VRP Total Break Service Time | 8 | Double | Total time spent servicing breaks | Output | Routes | TotalBreakServiceTime |
| totalcost | VRP Total Cost | 8 | Double | Total cost | Output | Routes | TotalCost |
| totaldistance | VRP Total Distance | 8 | Double | Total distance covered | Output | Routes | TotalDistance |
| totalorderservicetime | VRP Total Order Service Time | 8 | Double | Total time spent servicing orders | Output | Routes | TotalOrderServiceTime |
| totalrenewalservicetime | VRP Total Renewal Service Time | 2 | Small Integer | Time spent renewing at a depot | Output | Routes | TotalRenewalServiceTime |
| totaltime | VRP Total Time | 8 | Double | Total time used | Output | Routes | TotalTime |
| totaltraveltime | VRP Total Travel Time | 8 | Double | Total travel time used | Output | Routes | TotalTravelTime |
| totalviolationtime | VRP Total Violation Time | 8 | Double | Accumulated violation time | Output | Routes | TotalViolationTime |
| totalwaittime | VRP Total Wait Time | 8 | Double | Total time spent waiting | Output | Routes | TotalWaitTime |
| violationconstraints | Violation Constraints | 50 | String |  | Output | Routes | ViolatedConstraints |

* 1. RouteSeedPoint

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| routename | Route Name | 128 | String | Name of Route that Seed Point relates to. Corresponds to key value in Route layer |  |  |  |

* 1. SpecialtyName

List of available Specialties for the Plan. Can be empty if Specialties not being used.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| specialtyname | Specialty Name | 50 | String | Name of Specialty | Required | Specialties | Name |

* 1. Zone

Zone polygons for the Dispatch Location the Plan created for. Can be empty if no Zones exist.

|  |  |  |  |  |  |  |  |
| --- | --- | --- | --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| ishardzone | Is Hard Zone | 2 | Small Integer | Boolean if zone is hard or soft | Required | Route Zones | IsHardZone |
| routename | Route Name | 128 | String | Name of Route that Zone relates to. Corresponds to key value in Route layer | Required |  |  |

* 1. Break

Table that contains information on Breaks for the Plan’s Dispatch Location.

Note that Breaks has not been implemented into ERM yet, this is a placeholder for future functionality.

| **Name** | **Alias** | **Length** | **Type** | **Description** | **ERM** | **VRP Class** | **VRP Field** |
| --- | --- | --- | --- | --- | --- | --- | --- |
| ispaid | Is Paid | 2 | Small Integer | Boolean, if break is paid | Required | Breaks | IsPaid |
| maxcumworktime | Max Work Time | 8 | Double | Constraint for invoking a break at max work time intervals | Optional | Breaks | MaxCumWorkTime |
| maxtraveltimebetweenbreaks | Max Travel Time Between Breaks | 8 | Double | Constraint for invoking a break at max travel time intervals | Optional | Breaks | MaxTravelTimeBetweenBreaks |
| maxviolationtime | Max Violation Time | 8 | Double | Max time this break can be late | Optional | Breaks | MaxViolationTime |
| precedence | Precedence | 4 | Integer | Values to sequence the breaks of a given route. Breaks with a precedence value of 1 occur before those with a value of 2, and so on. All breaks must have a precedence value. The default value for this attribute is 1. | Optional | Breaks | Precedence |
| routename | Route Name | 128 | String | Name of Route that Break relates to. Corresponds to key value in Route layer | Required | Breaks | RouteName |
| sequence | Sequence | 4 | Integer | Sequence of this break on the route. Leave as null unless instructed otherwise | Output | Breaks | Sequence |
| servicetime | Service Time | 8 | Double | Duration in minutes this break will last | Required | Breaks | ServiceTime |
| timewindowend | Time Window End | 8 | Date | For a time-window break, this is the latest time it could be ongoing (UTC) | Optional | Breaks | TimeWindowEnd |
| timewindowstart | Time Window Start | 8 | Date | For a time window break, this is the earliest time it could begin (UTC) | Optional | Breaks | TimeWindowStart |

1. ERM Registry
   1. Registry

The Registry table stores basic metadata about each plan that is created. All values are managed by ERM.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** |
| dashboarditemid | Dashboard Id | 32 | String | Portal ID of the plan Dashboard, if created |
| dashboardurl | Dashboard URL | 255 | String | URL of the plan Dashboard, if created |
| displocname | Dispatch Location | 10 | String | Name of Dispatch Location that Plan created for. Corresponds to key value set in DispatchLocation table |
| itemid | Item Id | 32 | String | Portal ID of the plan feature service |
| layerurl | Layer URL | 255 | String | URL of the plan feature service |
| planningcutofftime | Planning Cutoff Time | 8 | Date | Cutoff time given when plan created |
| totalordercount | Total Order Count | 4 | Integer | Number of assigned orders |
| totalroutecount | Total Route Count | 4 | Integer | Number of solved routes |
| webmapitemid | Webmap Id | 32 | String | Portal ID of the plan web map |

1. MDM Locations
   1. MDM\_Locations

The MDM\_Locations point feature layer holds depot locations or common delivery locations. In the Route Planner app, the Move Location functionality pulls these locations to allow planners to easily move an order to a different location by selecting from a list.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** |
| displocname | Dispatch Location | 128 | String | Name of Dispatch Location that locations correspond to. Must match name in the ERM Plan Template\Depot layer. |
| locationname | Location Name | 255 | String | Descriptive name of the location. This value will be shown in Route Planner for Move Location |

1. GPS Template
   1. GPS Vehicle Updates

The GPS Vehicle Updates feature layer is designed to receive information from GeoEvent server on the locations of fleet vehicles. This is normally used when integrating ERM with Workforce.

|  |  |  |  |  |
| --- | --- | --- | --- | --- |
| **Name** | **Alias** | **Length** | **Type** | **Description** |
| bearing | Bearing | 8 | Double | Current vehicle bearing |
| driverid | Driver ID | 50 | String | The driver’s Portal UserID |
| lastgpsreport | Last GPS Report | 8 | Date | Last time location information was received |
| latitude | Latitude | 8 | Double | Current vehicle latitude |
| longitude | Longitude | 8 | Double | Current vehicle longitude |
| speedkph | Speed KPH | 8 | Double | Current vehicle speed in KPH |
| speedmph | Speed MPH | 8 | Double | Current vehicle speed in MPH |

1. Route Planner Managed Fields

There are several fields that are not in the data model for Orders and Routes, but the Route Planner application adds and manages them. These fields can be configured similar to other fields through the Route Planner configuration file. Can adjust visibility, editable state, alias, or sequence in field list.

* 1. Orders Fields

The following field is managed by Route Planner application and will not appear in the feature service for the Plan for GeoOrder layer:

* Edit Location
  + Allows user to move an Order point to a different location.
  1. Routes Fields

The following fields are managed by Route Planner application and will not appear in the feature service for the Plan for Route layer:

* View Routes
  + Allows user to toggle individual Routes on/off in the map.
* Symbology
  + Allows user to adjust the symbology of individual Routes.
* Is Hard Zone
  + Allows user to change value of Is Hard Zone attribute in the Zone feature that is related to the Route.