IPMDAR Schedule Dataset

Version 1.0

File Format Specification

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# Overview

This document is intended as a technical reference for computer programmers implementing software to support the exchange of data composing the IPMDAR Schedule Dataset.

# Data Model

Data in an IPMDAR Schedule Dataset are modeled as a collection of tables related by primary and foreign key constraints.

## Data Model Conventions

Tables

A table has a collection of fields and a collection of records. Each field has a name and a primitive data type. Each record has a collection of field values. Each field value must be consistent with the data type of the corresponding field. Records have an implicit sequence.

Nullable Fields

Records may omit values for fields that are nullable but must include values for fields that are not nullable. Unless otherwise noted, omitted field values may be interpreted as null, undefined, or “not applicable”. All of these interpretations are considered equivalent.

Key Constraints

A primary key constraint defines a collection of fields for a table such that the corresponding field values uniquely identify each record. No two records may have the same collection of corresponding field values.

A foreign key constraint defines a correspondence between a field in one table and a field in another table such that the field value for each record in the former must match the field value for some record in the latter.

Enumerations

Enumerations are implicit lookup tables available for use with foreign key constraints.

Singletons

Singletons are tables with exactly one record.

Strings

Strings are sequences are of text characters defined by the Unicode standard.

The following control characters are prohibited in all string values: (U+0000–U+0008), (U+000B–U+000C), (U+000E–U+001F), (U+007F). String values used as ID’s are further limited to a character set representing common printable characters (U+0020–U+007E).

Most string values must have normalized whitespace. A string value with normalized whitespace cannot begin or end with whitespace characters, cannot contain any whitespace characters other than the space character (U+0020), and cannot contain any sequence of two or more contiguous space characters.

Normalized whitespace is not required for string values used for remarks or other expository text.

Comparison of string values for the purpose of verifying key constraints is not case sensitive.

Empty string values are interpreted as equivalent to null values for fields with a string data type. Records must include non-empty string values for string fields that cannot be null.

Task Outline Hierarchical Structure

The hierarchical structure of the task outline is determined based on the level and sequence of the nodes reported. Specifically, nodes must be sorted in a manner consistent with a depth-first search of the node hierarchy, such that the parent node of a given node must be the nearest preceding node with a reported level less than that of the given node. Each node that succeeds another must have a level that is no more than 1 greater than the level of the preceding node. The minimum level is 1.

## Tables

### DatasetMetadata

|  |  |
| --- | --- |
| Table | DatasetMetadata |
| Entity | DatasetMetadata |
| Fields | Name | Data Type | Nullable |
| SecurityMarking | String | No |
| DistributionStatement | Text | Yes |
| ReportingPeriodEndDate | Date | No |
| ContractorName | String | Yes |
| ContractorIDCodeTypeID | StringID | Yes |
| ContractorIDCode | String | Conditional |
| ContractorAddress\_Street | Text | Yes |
| ContractorAddress\_City | String | Yes |
| ContractorAddress\_State | String | Yes |
| ContractorAddress\_Country | String | Yes |
| ContractorAddress\_ZipCode | String | Yes |
| PointOfContactName | String | Yes |
| PointOfContactTitle | String | Yes |
| PointOfContactTelephone | String | Yes |
| PointOfContactEmail | String | Yes |
| ContractName | String | Yes |
| ContractNumber | String | Yes |
| ContractType | String | Yes |
| ContractTaskOrEffortName | String | Yes |
| ProgramName | String | Yes |
| ProgramPhase | String | Yes |
| EVMSAccepted | Boolean | Yes |
| EVMSAcceptanceDate | Date | Conditional |
| Primary Key | [N/A] |
| Foreign Keys | ContractorIDCodeTypeID: ContractorIDCodeTypeEnum(ID) |
| Use Constraints | DatasetMetadata is a singleton. ContractorIDCode must be null unless ContractorIDCodeTypeID is not null.EVMSAcceptanceDate must be null unless EVMSAccepted has a value of True. |

### SourceSoftwareMetadata

|  |  |
| --- | --- |
| Table | SourceSoftwareMetadata |
| Entity | SourceSoftwareMetadata |
| Fields | Name | Data Type | Nullable |
| Data\_SoftwareName | String | Yes |
| Data\_SoftwareVersion | String | Yes |
| Data\_SoftwareCompanyName | String | Yes |
| Data\_SoftwareComments | Text | Yes |
| Export\_SoftwareName | String | Yes |
| Export\_SoftwareVersion | String | Yes |
| Export\_SoftwareCompanyName | String | Yes |
| Export\_SoftwareComments | Text | Yes |
| Primary Key | [N/A] |
| Foreign Keys | [N/A] |
| Use Constraints | SourceSoftwareMetadata is a singleton. |

### ProjectScheduleData

|  |  |
| --- | --- |
| Table | ProjectScheduleData |
| Entity | ProjectScheduleData |
| Fields | Name | Data Type | Nullable |
| StatusDate | Date | No |
| CurrentStartDate | Date | No |
| CurrentFinishDate | Date | No |
| BaselineStartDate | Date | Yes |
| BaselineFinishDate | Date | Yes |
| ActualStartDate | Date | Yes |
| ActualFinishDate | Date | Yes |
| DurationUnitsID | StringID | No |
| Primary Key | [N/A] |
| Foreign Keys | DurationUnitsID: DurationUnitsEnum(ID) |
| Use Constraints | ProjectScheduleData is a singleton. |

### ProjectCustomFieldDefinitions

|  |  |
| --- | --- |
| Table | ProjectCustomFieldDefinitions |
| Entity | ProjectCustomFieldDefinition |
| Fields | Name | Data Type | Nullable |
| CustomFieldID | StringID | No |
| Name | String | No |
| Comments | Text | Yes |
| Primary Key | CustomFieldID |
| Foreign Keys | CustomFieldID: CustomFieldEnum(ID) |
| Use Constraints |  |

### ProjectCustomFieldValues

|  |  |
| --- | --- |
| Table | ProjectCustomFieldValues |
| Entity | ProjectCustomFieldValue |
| Fields | Name | Data Type | Nullable |
| CustomFieldID | StringID | No |
| Value | String | No |
| Primary Key | CustomFieldID |
| Foreign Keys | CustomFieldID: ProjectCustomFieldDefinition(CustomFieldID) |
| Use Constraints |  |

### Calendars

|  |  |
| --- | --- |
| Table | Calendars |
| Entity | Calendar |
| Fields | Name | Data Type | Nullable |
| ID | StringID | No |
| Name | String | No |
| Comments | Text | Yes |
| Primary Key | ID |
| Foreign Keys | [N/A] |
| Use Constraints | Each record must have at least one associated record in the CalendarWorkshifts table. |

### CalendarWorkshifts

|  |  |
| --- | --- |
| Table | CalendarWorkshifts |
| Entity | CalendarWorkshift |
| Fields | Name | Data Type | Nullable |
| CalendarID | StringID | No |
| Ordinal | Integer | Yes |
| SundayWorkHours | Decimal | Yes |
| MondayWorkHours | Decimal | Yes |
| TuesdayWorkHours | Decimal | Yes |
| WednesdayWorkHours | Decimal | Yes |
| ThursdayWorkHours | Decimal | Yes |
| FridayWorkHours | Decimal | Yes |
| SaturdayWorkHours | Decimal | Yes |
| Primary Key | CalendarID, Ordinal |
| Foreign Keys | CalendarID: Calendar(ID) |
| Use Constraints | If null, Ordinal has a default value of zero.If null, each WorkHours field has a default value of zero; if not null, each must be greater than or equal to zero.At least one WorkHours field must be greater than zero. |

### CalendarExceptions

|  |  |
| --- | --- |
| Table | CalendarExceptions |
| Entity | CalendarException |
| Fields | Name | Data Type | Nullable |
| CalendarID | StringID | No |
| ExceptionDate | Date | No |
| WorkHours | Decimal | Yes |
| Primary Key | CalendarID, ExceptionDate |
| Foreign Keys | CalendarID: Calendar(ID) |
| Use Constraints | If null, WorkHours has a default value of zero. If not null, WorkHours must be greater than or equal to zero. |

### Tasks

|  |  |
| --- | --- |
| Table | Tasks |
| Entity | Task |
| Fields | Name | Data Type | Nullable |
| ID | StringID | No |
| Name | String | No |
| TaskTypeID | StringID | No |
| TaskSubtypeID | StringID | Yes |
| TaskPlanningLevelID | StringID | Conditional |
| WBSElementID | StringID | Yes |
| OBSElementID | StringID | Yes |
| ControlAccountID | StringID | Yes |
| WorkPackageID | StringID | Yes |
| IMPElementID | StringID | Yes |
| SOWReference | String | Yes |
| SubcontractorReference | String | Yes |
| EarnedValueTechniqueID | StringID | Yes |
| OtherEarnedValueTechnique | String | Conditional |
| SourceSubprojectReference | String | Yes |
| SourceTaskReference | String | Yes |
| Comments | Text | Yes |
| Primary Key | ID |
| Foreign Keys | TaskTypeID: TaskTypeEnum(ID)TaskSubtypeID: TaskSubtypeEnum(ID)TaskPlanningLevelID: TaskPlanningLevelEnum(ID)EarnedValueTechniqueID: EarnedValueTechniqueEnum(ID) |
| Use Constraints | TaskPlanningLevelID must not be null if TaskTypeID has a value of ACTIVITY.OtherEarnedValueTechnique must be null unless EarnedValueTechniqueID has a value of OTHER\_DISCRETE or FIXED\_X\_Y.Each record must have an associated record in the TaskScheduleData table.Each record with TaskTypeID equal to SUMMARY must have a record in the TaskOutlineStructure table associated by TaskID. |

### TaskScheduleData

|  |  |
| --- | --- |
| Table | TaskScheduleData |
| Entity | TaskScheduleDataRecord |
| Fields | Name | Data Type | Nullable |
| TaskID | StringID | No |
| CalendarID | StringID | No |
| CurrentDuration | Decimal | No |
| CurrentStartDate | Date | No |
| CurrentFinishDate | Date | No |
| EarlyStartDate | Date | No |
| EarlyFinishDate | Date | No |
| LateStartDate | Date | No |
| LateFinishDate | Date | No |
| FreeFloatDuration | Decimal | No |
| TotalFloatDuration | Decimal | No |
| OnCriticalPath | Boolean | No |
| OnDrivingPath | Boolean | Yes |
| BaselineDuration | Decimal | Yes |
| BaselineStartDate | Date | Yes |
| BaselineFinishDate | Date | Yes |
| StartVarianceDuration | Decimal | Yes |
| FinishVarianceDuration | Decimal | Yes |
| CalculatedPercentComplete  | Decimal | No |
| PhysicalPercentComplete  | Decimal | Yes |
| RemainingDuration | Decimal | No |
| ActualStartDate | Date | Yes |
| ActualFinishDate | Date | Yes |
| Primary Key | TaskID |
| Foreign Keys | TaskID: Task(ID)CalendarID: Calendar(ID) |
| Use Constraints | The following fields must be reported together: BaselineDuration, BaselineStartDate, BaselineFinishDate, StartVarianceDuration, and FinishVarianceDuration. That is, all must be null or all must not be null. |

### TaskCustomFieldDefinitions

|  |  |
| --- | --- |
| Table | TaskCustomFieldDefinitions |
| Entity | TaskCustomFieldDefinition |
| Fields | Name | Data Type | Nullable |
| CustomFieldID | StringID | No |
| Name | String | No |
| Comments | Text | Yes |
| Primary Key | CustomFieldID |
| Foreign Keys | CustomFieldID: CustomFieldEnum(ID) |
| Use Constraints |  |

### TaskCustomFieldValues

|  |  |
| --- | --- |
| Table | TaskCustomFieldValues |
| Entity | TaskCustomFieldValue |
| Fields | Name | Data Type | Nullable |
| TaskID | StringID | No |
| CustomFieldID | StringID | No |
| Value | String | No |
| Primary Key | TaskID, CustomFieldID |
| Foreign Keys | TaskID: Task(ID)CustomFieldID: TaskCustomFieldDefinition(CustomFieldID) |
| Use Constraints |  |

### TaskConstraints

|  |  |
| --- | --- |
| Table | TaskConstraints |
| Entity | TaskConstraint |
| Fields | Name | Data Type | Nullable |
| TaskID | StringID | No |
| ConstraintTypeID | StringID | No |
| OtherConstraintType | String | Conditional |
| ConstraintDate | Date | Conditional |
| Primary Key | TaskID, ConstraintTypeID |
| Foreign Keys | TaskID: Task(ID)ConstraintTypeID: TaskConstraintType(ID) |
| Use Constraints | OtherConstraintType must be null unless ConstraintTypeID has a value of OTHER.ConstraintDate must not be null unless ConstraintTypeID has a value of AS\_LATE\_AS\_POSSIBLE or OTHER. |

### TaskRelationships

|  |  |
| --- | --- |
| Table | TaskRelationships |
| Entity | TaskRelationship |
| Fields | Name | Data Type | Nullable |
| PredecessorTaskID | StringID | No |
| SuccessorTaskID | StringID | No |
| RelationshipTypeID | StringID | No |
| LagDuration | Decimal | Yes |
| LagCalendarID | StringID | Yes |
| Primary Key | PredecessorTaskID, SuccessorTaskID, RelationshipTypeID |
| Foreign Keys | PredecessorTaskID: Task(ID)SuccessorTaskID: Task(ID)RelationshipTypeID: TaskRelationshipTypeEnum(ID)LagCalendarID: Calendar(ID) |
| Use Constraints | If null, LagCalendarID defaults to the ID of the calendar associated with the successor task.  |

### TaskOutlineStructure

|  |  |
| --- | --- |
| Table | TaskOutlineStructure |
| Entity | TaskOutlineNode |
| Fields | Name | Data Type | Nullable |
| Level | Integer | No |
| TaskID | StringID | No |
| ParentTaskID | StringID | Conditional |
| Primary Key | TaskID |
| Foreign Keys | TaskID: Task(ID)ParentTaskID: Task(ID) |
| Use Constraints | Order of records is significant. In particular, hierarchical structure is determined based on level and sequence of records. See above.The first record must have Level equal to 1. All other records must have Level greater than or equal to 1.Records with Level equal to 1 must have a null ParentTaskID. All other records must have a ParentTaskID equal to the TaskID of the parent record determined by the hierarchical structure.Every parent record determined by the hierarchical structure must be associated by TaskID with a record in the Tasks table with TaskTypeID equal to SUMMARY. |

### Resources

|  |  |
| --- | --- |
| Table | Resources |
| Entity | Resource |
| Fields | Name | Data Type | Nullable |
| ID | StringID | No |
| Name | String | No |
| ElementOfCostID | StringID | No |
| Comments | Text | Yes |
| Primary Key | ID |
| Foreign Keys | ElementOfCostID: ElementOfCostEnum(ID) |
| Use Constraints |  |

### ResourceCustomFieldDefinitions

|  |  |
| --- | --- |
| Table | ResourceCustomFieldDefinitions |
| Entity | ResourceCustomFieldDefinition |
| Fields | Name | Data Type | Nullable |
| CustomFieldID | StringID | No |
| Name | String | No |
| Comments | Text | Yes |
| Primary Key | CustomFieldID |
| Foreign Keys | CustomFieldID: CustomFieldEnum(ID) |
| Use Constraints |  |

### ResourceCustomFieldValues

|  |  |
| --- | --- |
| Table | ResourceCustomFieldValues |
| Entity | ResourceCustomFieldValue |
| Fields | Name | Data Type | Nullable |
| ResourceID | StringID | No |
| CustomFieldID | StringID | No |
| Value | String | No |
| Primary Key | ResourceID, CustomFieldID |
| Foreign Keys | ResourceID: Resource(ID)CustomFieldID: ResourceCustomFieldDefinition(CustomFieldID) |
| Use Constraints |  |

### ResourceAssignments

|  |  |
| --- | --- |
| Table | ResourceAssignments |
| Entity | ResourceAssignment |
| Fields | Name | Data Type | Nullable |
| ResourceID | StringID | No |
| TaskID | StringID | No |
| Budget\_AtCompletion\_Dollars | Decimal | Yes |
| Budget\_AtCompletion\_Hours | Decimal | Yes |
| Estimate\_ToComplete\_Dollars | Decimal | Yes |
| Estimate\_ToComplete\_Hours | Decimal | Yes |
| Actual\_ToDate\_Dollars | Decimal | Yes |
| Actual\_ToDate\_Hours | Decimal | Yes |
| PhysicalPercentComplete | Decimal | Yes |
| Primary Key | ResourceID, TaskID |
| Foreign Keys | ResourceID: Resource(ID)TaskID: Task(ID) |
| Use Constraints |  |

## Primitive Data Types

|  |
| --- |
| Primitive Data Types |
| Boolean | Values of two-valued logic (i.e. “true” and “false”). |
| Date | Year, month, and day, without reference to the time of day or a specific time zone. |
| Decimal | Number that can be represented with decimal digits, with possible integral and/or fractional component. |
| Integer | Number that can be represented with decimal digits, with no fractional component. |
| String | A sequence of Unicode characters, with normalized whitespace. |
| StringID | A sequence of Unicode characters, with normalized whitespace and limited character set. |
| Text | A sequence of Unicode characters intended for remarks or other expository text. |

## Enumerations

### ContractorIDCodeTypeEnum

|  |  |
| --- | --- |
| Enumeration | ContractorIDCodeTypeEnum |
| Values | ID | Name |
| DUNS | DUNS |
| DUNS\_PLUS\_4 | DUNS+4 |
| CAGE | CAGE |
| Use Constraints |  |

### DurationUnitsEnum

|  |  |
| --- | --- |
| Enumeration | DurationUnitsEnum |
| Values | ID | Name |
| DAYS | Days |
| HOURS | Hours |
| Use Constraints |  |

### TaskTypeEnum

|  |  |
| --- | --- |
| Enumeration | TaskTypeEnum |
| Values | ID | Name |
| ACTIVITY | Activity |
| MILESTONE | Milestone |
| SUMMARY | Summary |
| HAMMOCK | Hammock |
| Use Constraints |  |

### TaskSubtypeEnum

|  |  |
| --- | --- |
| Enumeration | TaskSubtypeEnum |
| Values | ID | Name |
| RISK\_MITIGATION\_TASK | Risk Mitigation Task |
| SCHEDULE\_VISIBILITY\_TASK | Schedule Visibility Task |
| SCHEDULE\_MARGIN | Schedule Margin |
| CONTRACTUAL\_MILESTONE | Contractual Milestone |
| Use Constraints |  |

### TaskPlanningLevelEnum

|  |  |
| --- | --- |
| Enumeration | TaskPlanningLevelEnum |
| Values | ID | Name |
| SUMMARY\_LEVEL\_PLANNING\_PACKAGE | Summary Level Planning Package |
| CONTROL\_ACCOUNT | Control Account |
| PLANNING\_PACKAGE | Planning Package |
| WORK\_PACKAGE | Work Package |
| ACTIVITY | Activity |
| Use Constraints |  |

### EarnedValueTechniqueEnum

|  |  |
| --- | --- |
| Enumeration | EarnedValueTechniqueEnum |
| Values | ID | Name |
| APPORTIONED\_EFFORT | Apportioned Effort |
| LEVEL\_OF\_EFFORT | Level of Effort |
| MILESTONE | Milestone |
| FIXED\_0\_100 | 0/100 |
| FIXED\_100\_0 | 100/0 |
| FIXED\_X\_Y | X/Y |
| PERCENT\_COMPLETE | Percent Complete |
| STANDARDS | Standards |
| UNITS | Units |
| OTHER\_DISCRETE | Other Discrete |
| Use Constraints |  |

### TaskConstraintTypeEnum

|  |  |
| --- | --- |
| Enumeration | TaskConstraintTypeEnum |
| Values | ID | Name |
| START\_NO\_EARLIER\_THAN | Start No Earlier Than |
| FINISH\_NO\_EARLIER\_THAN | Finish No Earlier Than |
| START\_NO\_LATER\_THAN | Start No Later Than |
| FINISH\_NO\_LATER\_THAN | Finish No Later Than |
| MUST\_START\_ON | Must Start On |
| MUST\_FINISH\_ON | Must Finish On |
| AS\_LATE\_AS\_POSSIBLE | As Late As Possible |
| SHOULD\_START\_NO\_LATER\_THAN | Should Start No Later Than |
| SHOULD\_FINISH\_NO\_LATER\_THAN | Should Finish No Later Than |
| SHOULD\_START\_ON | Should Start On |
| SHOULD\_FINISH\_ON | Should Finish On |
| RESOURCE\_LEVELING\_START\_DELAY | Resource Leveling Start Delay |
| RESOURCE\_LEVELING\_FINISH\_DELAY | Resource Leveling Finish Delay |
| DEADLINE | Deadline |
| OTHER | Other |
| Use Constraints |  |

### TaskRelationshipTypeEnum

|  |  |
| --- | --- |
| Enumeration | TaskRelationhipTypeEnum |
| Values | ID | Name |
| FINISH\_TO\_START | Finish-to-Start |
| START\_TO\_START | Start-to-Start |
| FINISH\_TO\_FINISH | Finish-to-Finish |
| START\_TO\_FINISH | Start-to-Finish |
| Use Constraints |  |

### ElementOfCostEnum

|  |  |
| --- | --- |
| Enumeration | ElementOfCostEnum |
| Values | ID | Name |
| LABOR | Labor |
| MATERIAL | Material |
| OTHER\_DIRECT\_COSTS | Other Direct Costs |
| SUBCONTRACT | Subcontract |
| Use Constraints |  |

### CustomFieldEnum

|  |  |
| --- | --- |
| Enumeration | CustomFieldEnum |
| Values | ID | Name |
| FIELD\_01 | Field 01 |
| FIELD\_02 | Field 02 |
| FIELD\_03 | Field 03 |
| FIELD\_04 | Field 04 |
| FIELD\_05 | Field 05 |
| FIELD\_06 | Field 06 |
| FIELD\_07 | Field 07 |
| FIELD\_08 | Field 08 |
| FIELD\_09 | Field 09 |
| FIELD\_10 | Field 10 |
| Use Constraints |  |

# File Format

The file format for an IPMDAR Schedule Dataset is a ZIP file containing multiple text file entries. One text file entry conveys type and version information. All other text file entries convey data represented in JSON. Each JSON file entry corresponds to a single data table.

## File Conventions

Text file entries must be encoded in UTF-8. Compressed file entries must be compressed using the DEFLATE compression method. File entries must not be encrypted.

The file entry for a table may be omitted if the table has no records. The file entry for a singleton may be omitted if all its fields are null. The file entry for type/version information must always be included.

## File Contents

|  |
| --- |
| ZIP File Entries |
|  | Name | Table |
| FileType.txt | [N/A] |
| DatasetMetadata.json | DatasetMetadata |
| SourceSoftwareMetadata.json | SourceSoftwareMetadata |
| ProjectScheduleData.json | ProjectScheduleData |
| ProjectCustomFieldDefinitions.json | ProjectCustomFieldDefinitions |
| ProjectCustomFieldValues.json | ProjectCustomFieldValues |
| Calendars.json | Calendars |
| CalendarWorkshifts.json | CalendarWorkshifts |
| CalendarExceptions.json | CalendarExceptions |
| Tasks.json | Tasks |
| TaskScheduleData.json | TaskScheduleData |
| TaskCustomFieldDefinitions.json | TaskCustomFieldDefinitions |
| TaskCustomFieldValues.json | TaskCustomFieldValues |
| TaskConstraints.json | TaskConstraints |
| TaskRelationships.json | TaskRelationships |
| TaskOutlineStructure.json | TaskOutlineStructure |
| Resources.json | Resources |
| ResourceCustomFieldDefinitions.json | ResourceCustomFieldDefinitions |
| ResourceCustomFieldValues.json | ResourceCustomFieldValues |
| ResourceAssignments.json | ResourceAssignments |

## File Type/Version

The ‘FileType.txt’ file entry specifies the type and version of the IPMDAR Schedule Dataset file. This file entry must contain the following exact text string (excluding quotation marks): “IPMDAR\_SCHEDULE\_DATASET/1.0”.

# Representation in JSON

## JSON Conventions

Each table is represented in JSON as an array of objects. Singletons are an exception. They are represented directly as a single object. Objects correspond to records, and the sequence of objects in JSON represents the implicit sequence of records in the table.

Each record is represented in JSON as an object with name/value pairs corresponding to field values. The name of each pair must exactly match the name of the corresponding field, and the value of each pair must follow the conventions below for representing the corresponding primitive data type in JSON. Names must be unique within the scope of each object and each name must correspond to a field defined for the table.

Objects must include name/value pairs for fields that are not null, and these pairs must not have a JSON value of null or an empty JSON string value. Conversely, objects may or may not include name/value pairs for fields that are null. If included, these pairs may have a JSON value of null or an empty JSON string value. Only pairs for fields with a primitive data type of String, StringID, or Text may have an empty JSON string value.

Primitive data types are represented as follows:

|  |
| --- |
| Representation of Primitive Data Types |
| Boolean | JSON value of true or false. |
| Date | JSON string encoding a valid date, without time component or time zone, formatted as follows: “yyyy-mm-dd” (e.g. “2016-01-31”). |
| Decimal | JSON number. |
| Integer | JSON number with fractional component equal to zero. |
| String | JSON string, with normalized whitespace. |
| StringID | JSON string, with normalized whitespace and limited character set. |
| Text | JSON string. |

## JSON Schema Sample

|  |  |
| --- | --- |
| Schema | Resources.json |
| { "$schema": "http://json-schema.org/draft-04/schema#", "type": "array", "items": { "type": "object", "properties": { "ID": {"type": "string"}, "Name": {"type": "string"}, "ElementOfCostID": {"type": "string"}, "Comments": {"type": ["string", "null"]} }, "required": ["ID", "Name", "ElementOfCostID"] }} |

## JSON Data Sample

|  |  |
| --- | --- |
| Data | Resources.json |
| [ { "ID": "ENG-01", "Name": "Engineering 01", "ElementOfCostID": "LABOR" }, { "ID": "ENG-02", "Name": "Engineering 02", "ElementOfCostID": "LABOR" }, { "ID": "MAT-01", "Name": "Material 01", "ElementOfCostID": "MATERIAL" }] |

# References

JSON - The JSON Data Interchange Format, ECMA-404. 2013.

JSON Schema - json-schema.org

Unicode - The Unicode Standard, Version 9.0. 2016.

UTF-8 - “UTF-8 encoding scheme,” The Unicode Standard, Version 9.0, §3.10 D95. 2016.

ZIP File Format - .ZIP File Format Specification, Version 6.3.4. 2014.