

# Working with Date-Time Data

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# Overview

- **Session will focus on fields of type date in Feature Services and Map Services**
- **Review how date fields have work**
- **Discuss new enhancements**



# Date Fields in Map Services and Feature Services

The background of the slide is a vibrant, abstract composition. It features large, flowing shapes in shades of purple, magenta, and pink. Overlaid on these are faint, stylized map elements, including contour lines and a grid pattern. A thin, bright yellow arc curves across the right side of the image. In the bottom right corner, there is a small, detailed illustration of a mountain range with a winding path or road.

# Date Field Values in Map Service / Feature Service

- Date field values in query results are returned in UNIX Epoch Time
  - Milliseconds since Jan 1, 1970 in UTC
- Example:

```
"features": [  
  {  
    "attributes": {  
      "OBJECTID": 1,  
      "created_user": "GDB",  
      "created_date": 1621874273000,  
      "timeaware_dt_eastern": 1621874273000,  
      "regular_dt_pacific": 1621874273000  
    },  
    "geometry": {  
      "x": -13046320.0177,  
      "y": 4036559.4569000006  
    }  
  }  
]
```

<b>GMT</b>	: Monday, May 24, 2021 4:37:53 PM
<b>Your time zone</b>	: Monday, May 24, 2021 9:37:53 AM GMT-07:00 DST



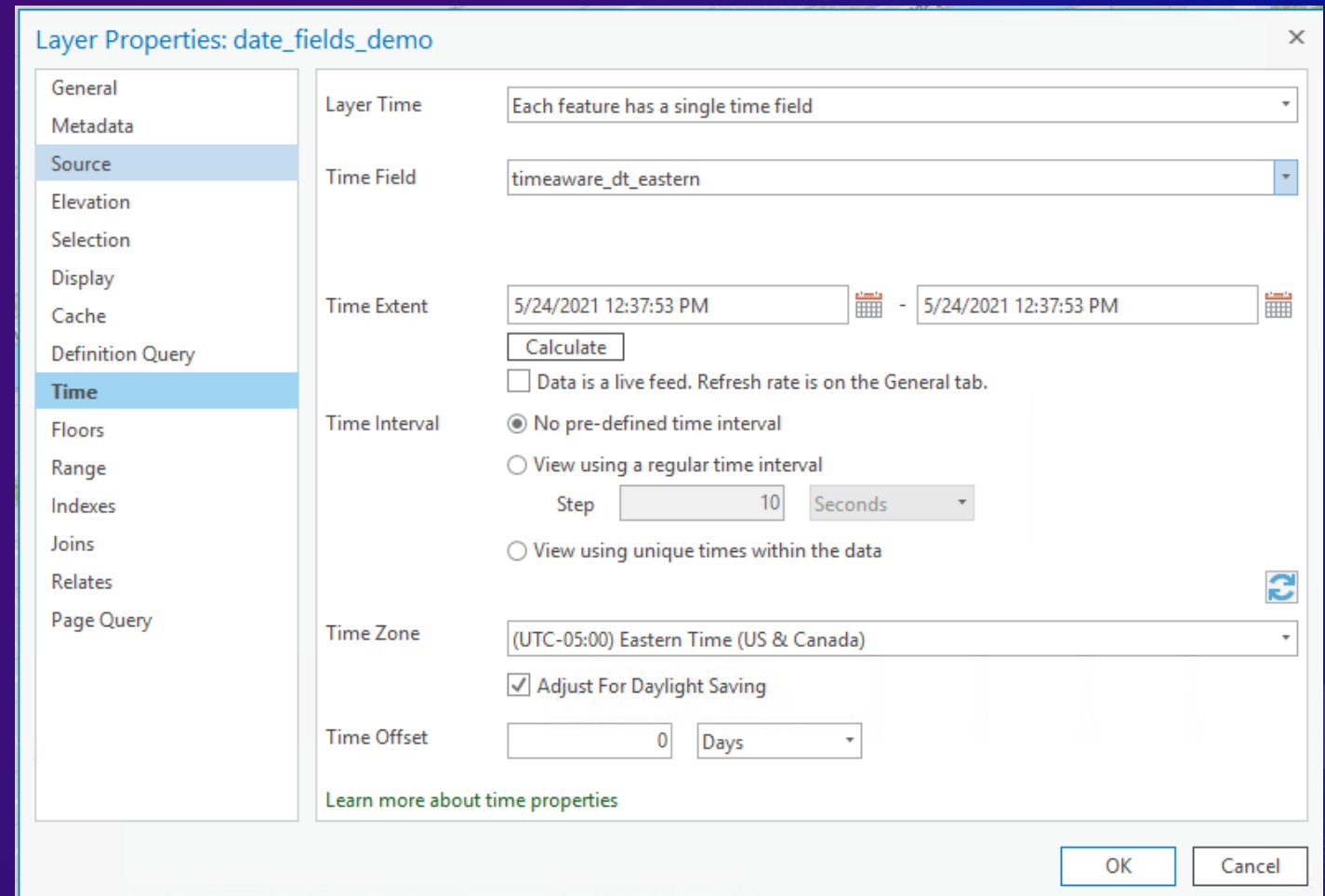
# Date Fields and Time Zones

- **Results in UTC**
  - Need to define date fields time zones when publishing
- **3 ways to define date fields time zones**
  - Date fields described in time aware layers
  - Editor tracking date fields in UTC
  - Other date fields in the layer
- **Any or none of these may be set when publishing**



# Date Fields in Time Aware Layers

- Time aware layers can be defined in ArcGIS Pro or ArcMap
- Properties include the time zone
- If no time zone set, date field values are assumed to be UTC



The screenshot shows the 'Layer Properties: date\_fields\_demo' dialog box with the 'Time' tab selected. The settings are as follows:

- Layer Time:** Each feature has a single time field
- Time Field:** timeaware\_dt\_eastern
- Time Extent:** 5/24/2021 12:37:53 PM - 5/24/2021 12:37:53 PM. Includes a 'Calculate' button and a checkbox for 'Data is a live feed. Refresh rate is on the General tab.'
- Time Interval:**
  - ☒ No pre-defined time interval
  - ☐ View using a regular time interval: Step 10 Seconds
  - ☐ View using unique times within the data
- Time Zone:** (UTC-05:00) Eastern Time (US & Canada). Includes a checked checkbox for 'Adjust For Daylight Saving'.
- Time Offset:** 0 Days

At the bottom, there is a link 'Learn more about time properties' and 'OK' and 'Cancel' buttons.

# Editor Tracking Date Fields

- By default editor tracking fields are in UTC
- Can be set to be in database time
  - Publishing will require date fields time reference to be set

The screenshot shows the 'Feature Class Properties' dialog box for the feature class 'uc2021.GDB.date\_fields\_demo'. The 'Editor Tracking' tab is active. The 'Enable editor tracking' toggle is turned on. The 'Creator Field' is 'created\_user', the 'Create Date Field' is 'created\_date', the 'Editor Field' is 'last\_edited\_user', and the 'Edit Date Field' is 'last\_edited\_date'. The 'Time standard' is set to 'UTC (recommended)'. There is a link to 'Learn more about editor tracking' at the bottom. The background shows a map of a park area with trees and a path.

Feature Class Properties: uc2021.GDB.date\_fields\_demo

Source  
Indexes  
Relationships  
**Editor Tracking**

Enable editor tracking ☒

Specify the fields to record the user name and date when a feature is created or edited. Fields specified will be maintained by ArcGIS. Any new fields will be created automatically.

Creator Field  
created\_user

Create Date Field  
created\_date

Editor Field  
last\_edited\_user

Edit Date Field  
last\_edited\_date

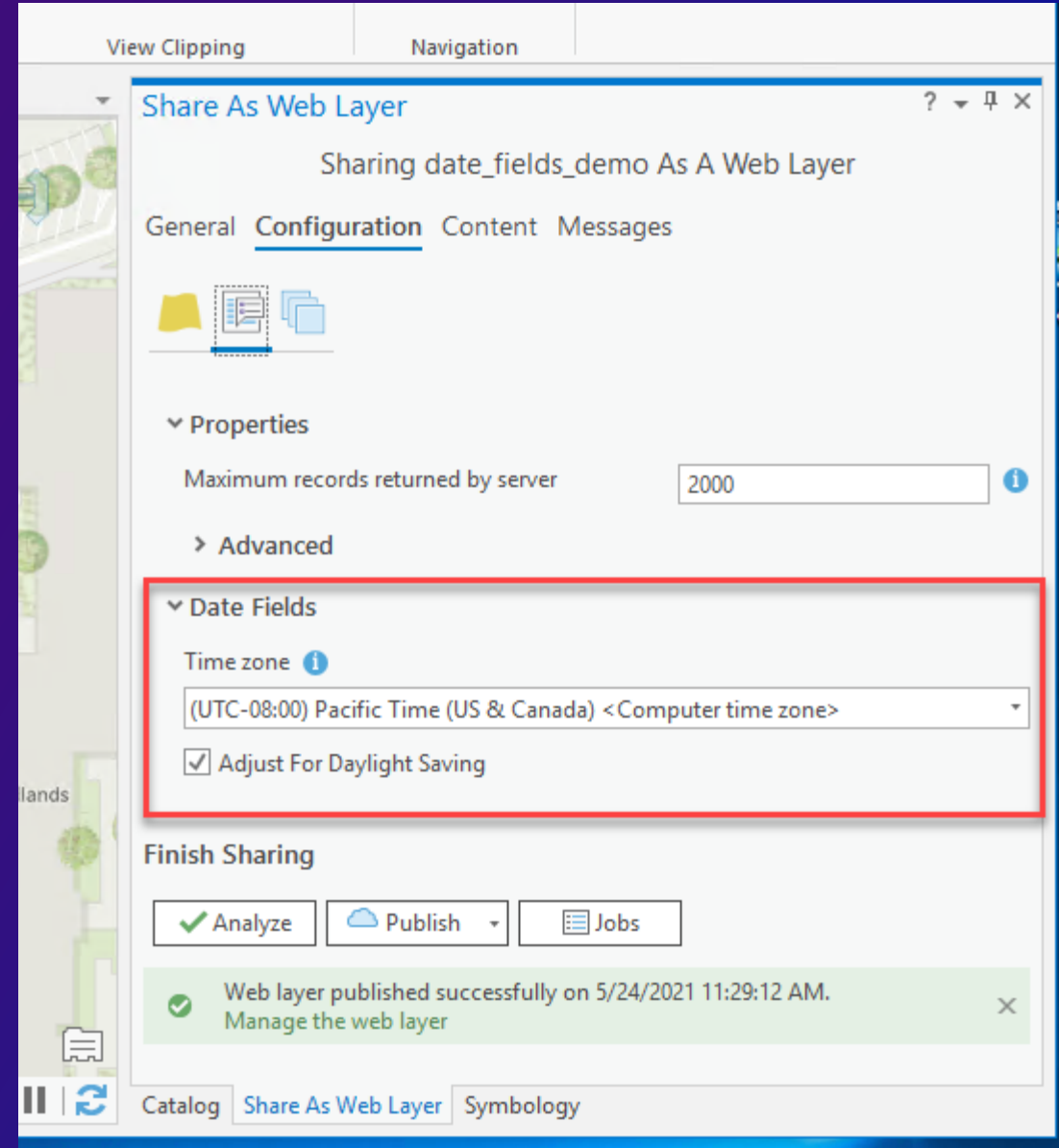
Time standard:  
☒ UTC (recommended)  
☐ Database time

[Learn more about editor tracking](#)

OK Cancel

# Other Date Fields in the Layer

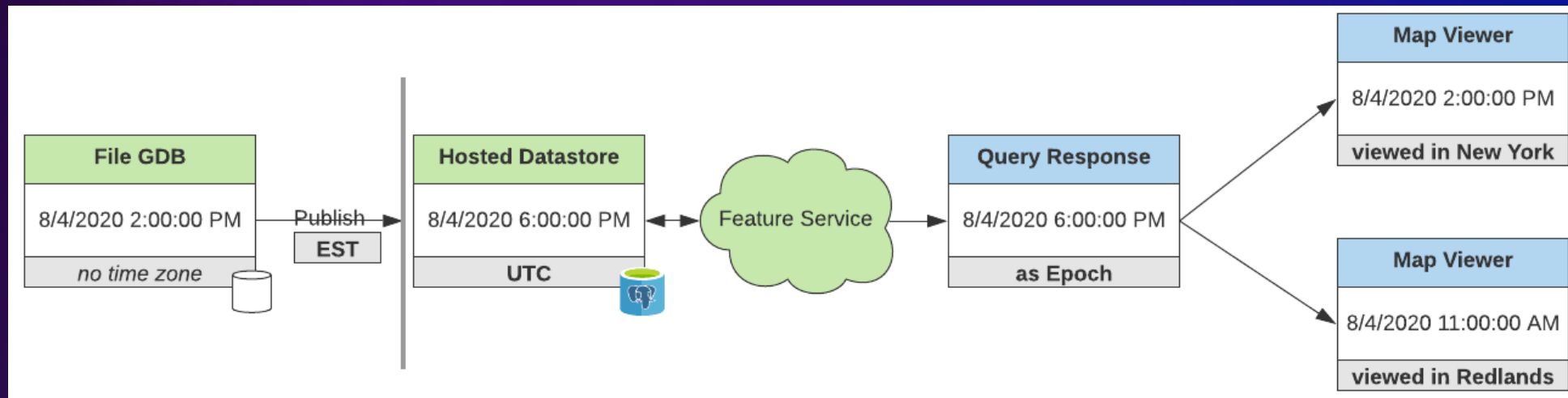
- Define date field data time zone when publishing
  - Date fields time reference
- If no time zone set, date field values are assumed to be UTC





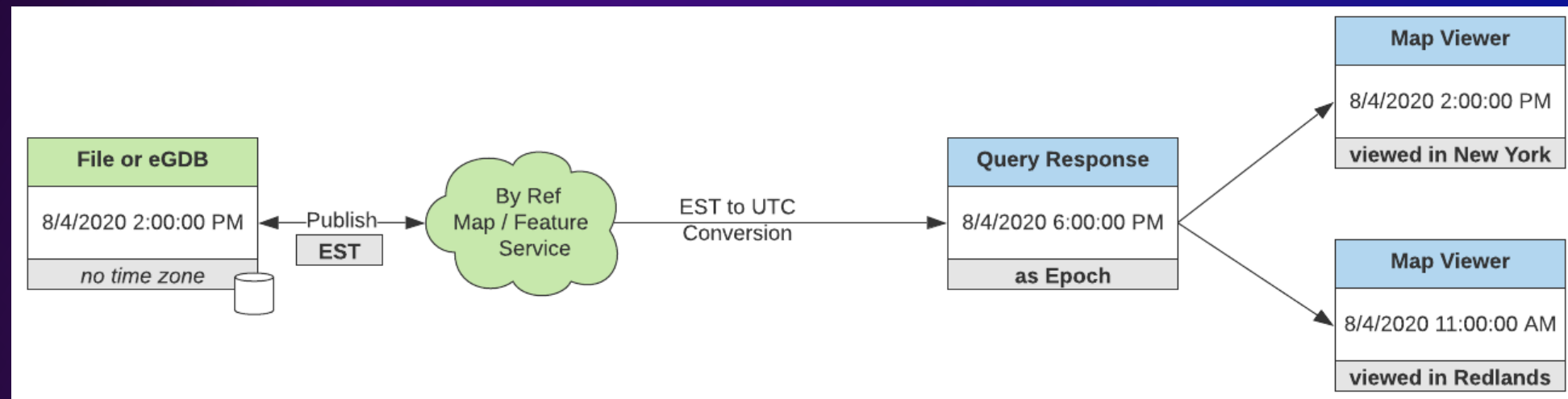
# Publishing – Hosted FS

- Client specifies the time zone of the date fields when publishing
- Dates values are converted to UTC when copied into back end data store
- FS works directly with already converted UTC values
  - Feature service time zone properties are all UTC



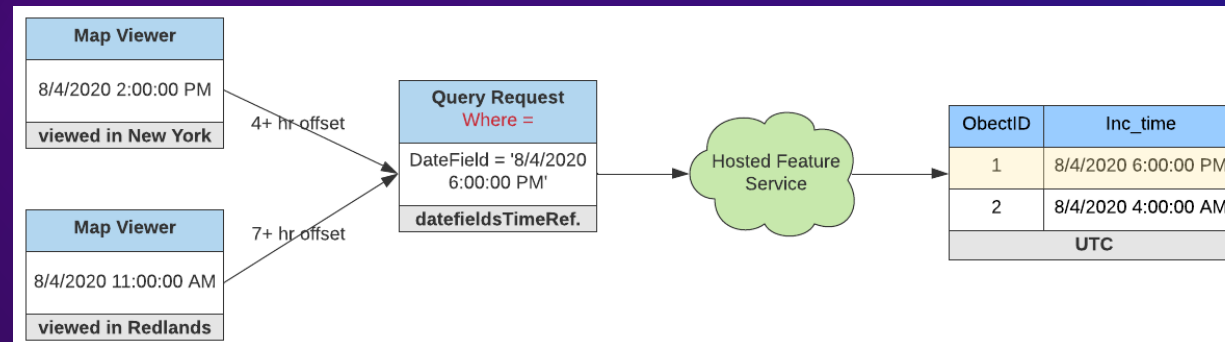
# Publishing – Non-Hosted MS/FS

- Client specifies the time zone of the date fields when publishing
- MS / FS converts to UTC on the fly for query results
- FS converts from UTC to data's time zone when writing edits to database
  - Feature service time zone properties are the time zone defined when publishing

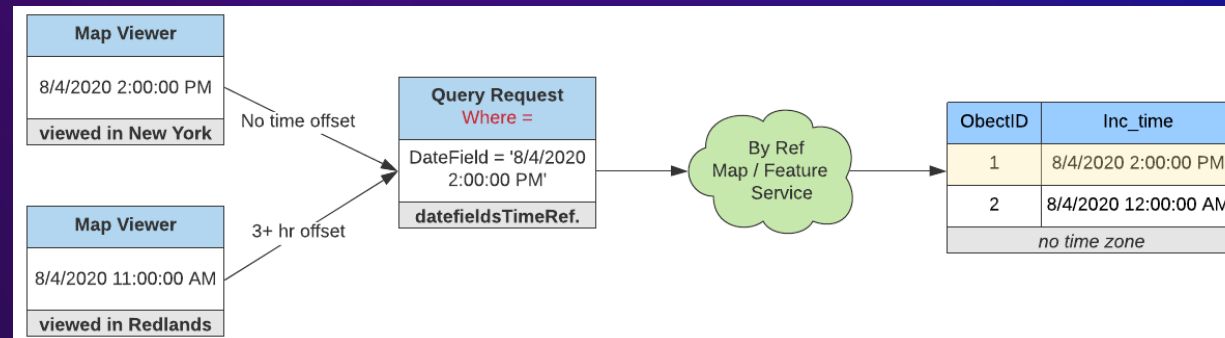


# Querying with Where Clause and Date Fields

- Query where clauses with date fields require input in the data's time zone
  - Clients can use time zone info in the layer to know how the correct time zone
  - Results are in UTC



Hosted Feature Service



Non-Hosted MS / FS

# Layer Time Zone Info

[https://gm10-2.esri.com/server/rest/services/date\\_fields\\_demo/FeatureServer/0?f=pjson](https://gm10-2.esri.com/server/rest/services/date_fields_demo/FeatureServer/0?f=pjson)

```
"timeInfo": {
  "startTimeField": "timeaware_dt_eastern",
  "endTimeField": null,
  "trackIdField": null,
  "type": "field",
  "timeExtent": [
    1621874273000,
    1621874273000
  ],
  "timeReference": {
    "timeZone": "Eastern Standard Time",
    "respectsDaylightSaving": true
  },
  "timeInterval": 10,
  "timeIntervalUnits": "esriTimeUnitsUnknown",
  "exportOptions": {
    "useTime": true,
    "timeDataCumulative": false,
    "timeOffset": null,
    "timeOffsetUnits": null
  },
  "hasLiveData": false
},
```

Time Aware  
Date Field

Time Aware  
Time Zone

```
"editFieldsInfo": {
  "creationDateField": "created_date",
  "creatorField": "created_user",
  "editDateField": "last_edited_date",
  "editorField": "last_edited_user",
  "dateFieldsTimeReference": {
    "timeZone": "UTC",
    "respectsDaylightSaving": false
  }
},
```

ET Date Field

ET Date Field

Editor Tracking  
Time Zone

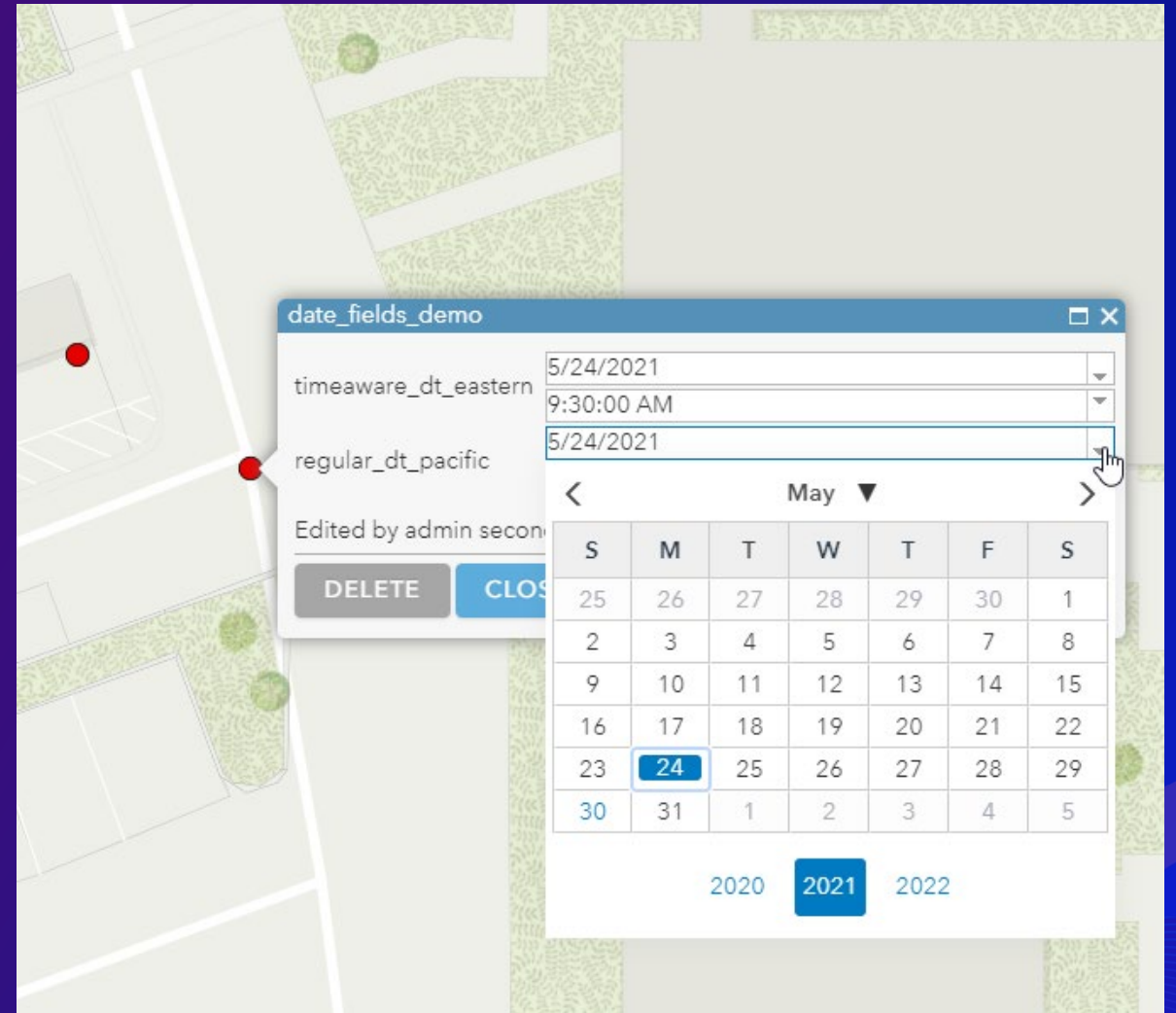
```
"dateFieldsTimeReference": {
  "timeZone": "Pacific Standard Time",
  "respectsDaylightSaving": true
},
```

Regular Date Fields  
Time Zone



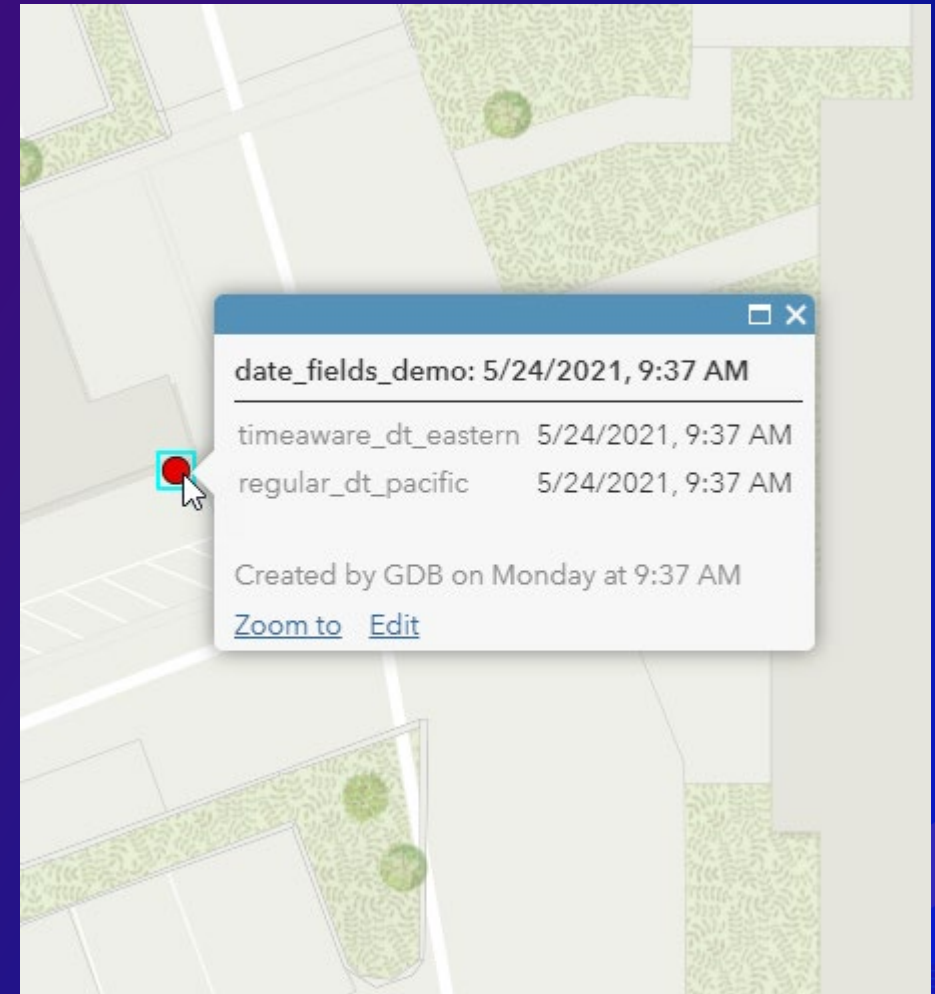
# Editing and Sync

- **Edits are sent to the FS in UNIX Epoch Time**
  - Feature Service uses time zone info to convert back to the fields time zone when writing values to the database
  - No conversion if the data is already in UTC
- **Sync also works in UTC and applies the same conversions when needed**

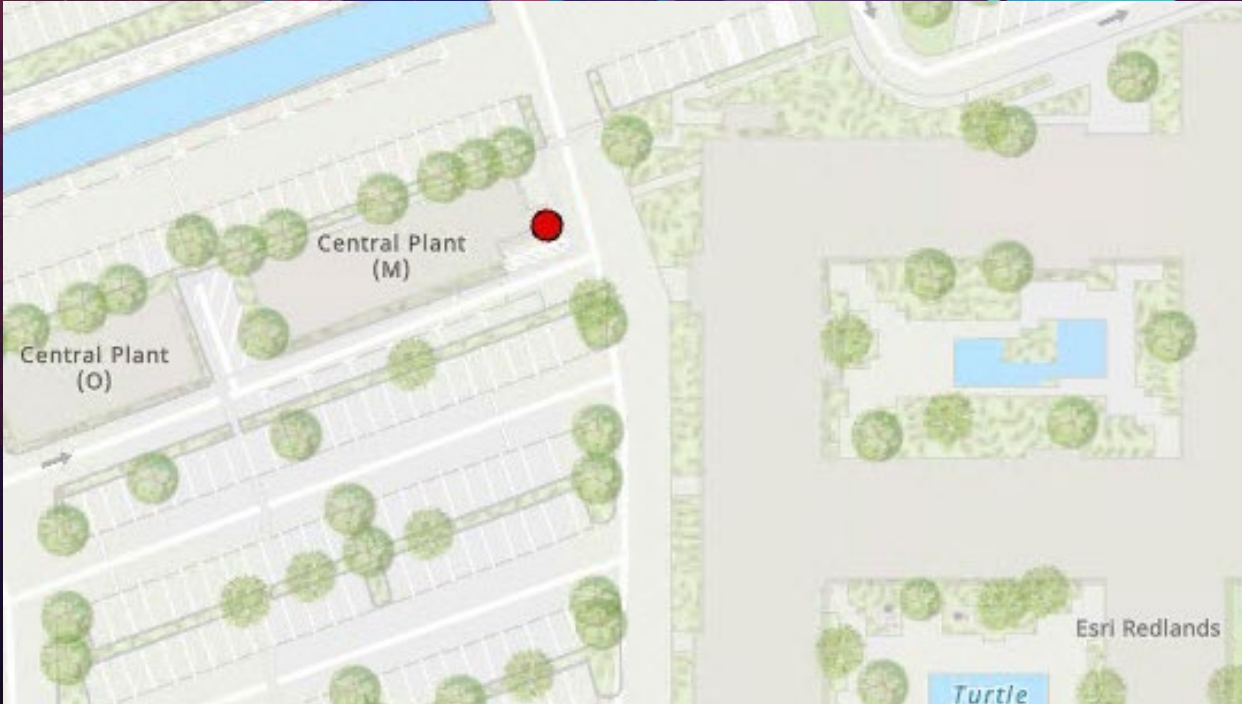


# Client Behavior

- **Web Clients work in the devices time zone**
  - E.g. Shows dates in Pacific in the browser if my laptop's time zone is Pacific
  - Client converts from UTC to device time zone when showing data
  - Client converts from device time zone to UTC when sending edits to the FS
- **ArcGIS Pro**
  - Doesn't convert the UTC dates from the server







# Feature Service Date Fields Demo

Gary MacDougall



# Enhancements

ArcGIS Enterprise 10.9 / Latest Online updates



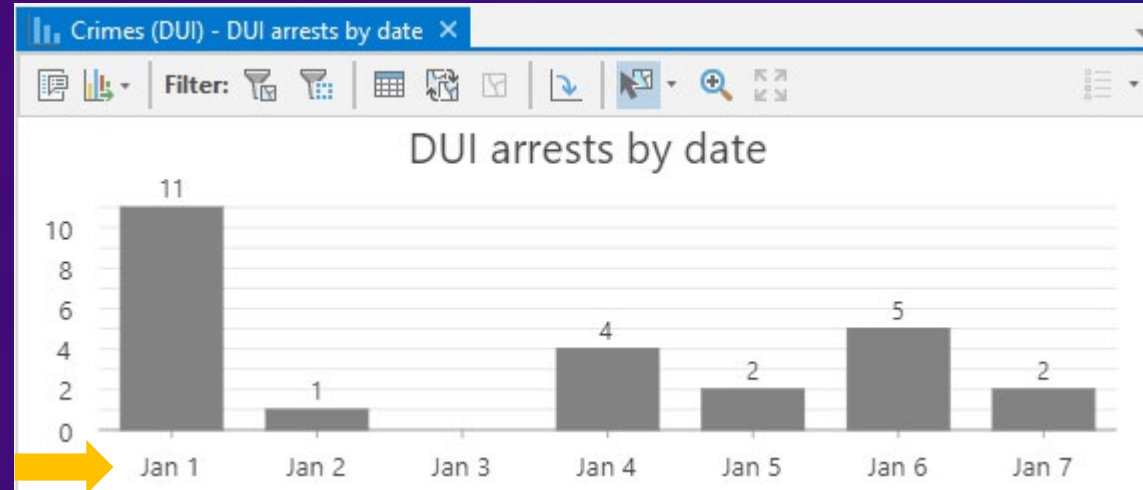
# Demo Outline

- **Setting time zone**
- **Preferred time zone**
- **Unknown time zone**

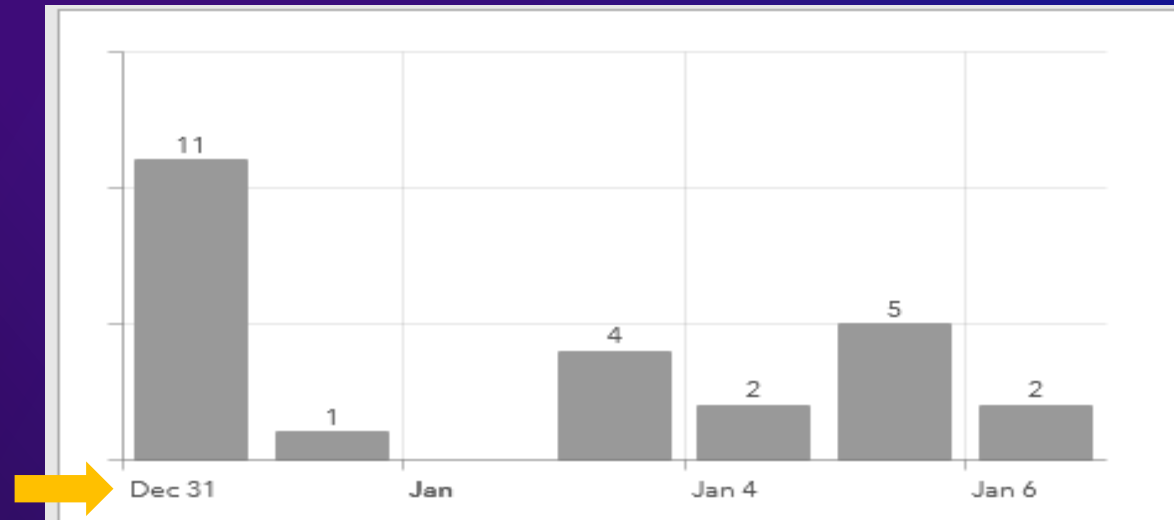


# Incorrect charts

ArcGIS Pro

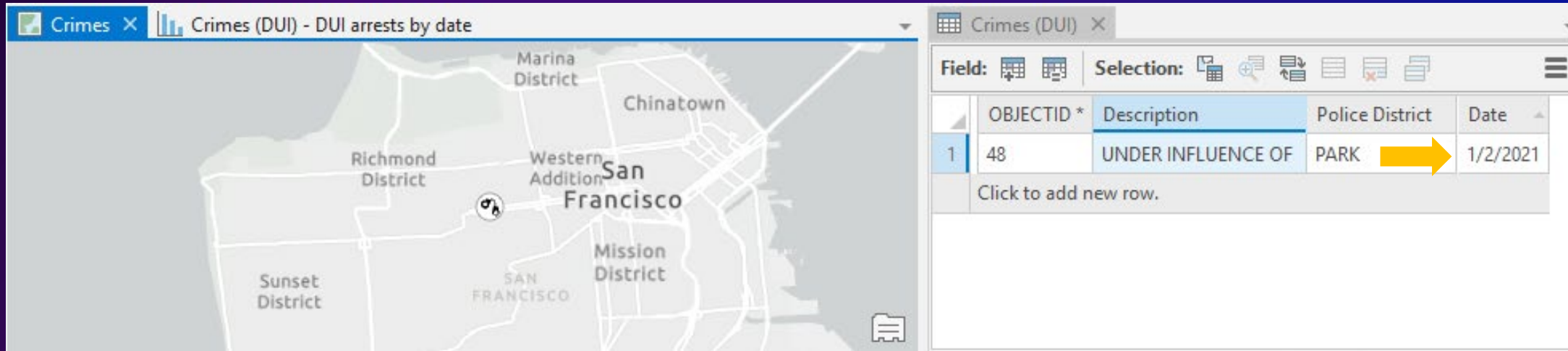


ArcGIS Dashboard app

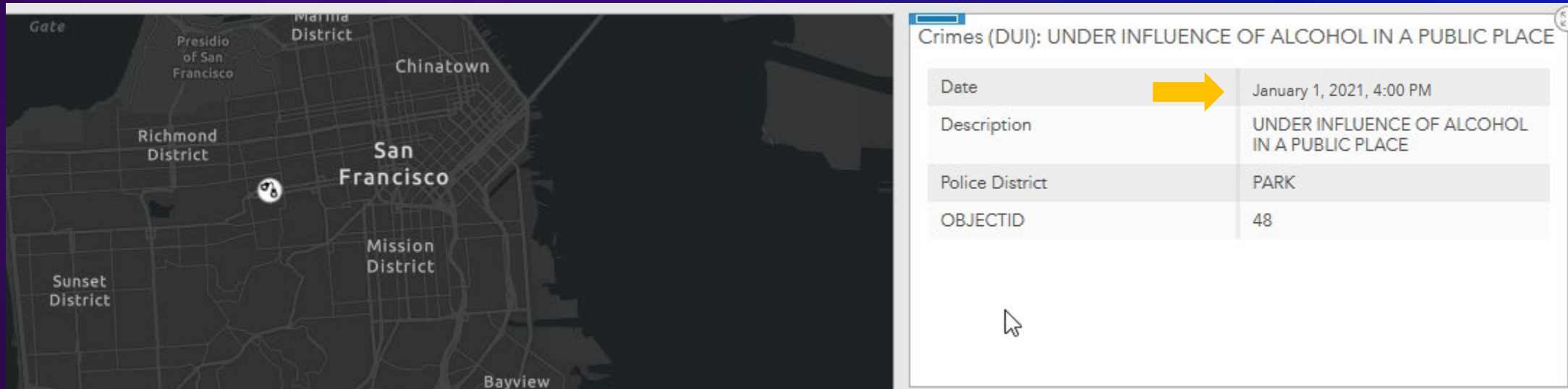


# The reason why incorrect chart generated

ArcGIS Pro

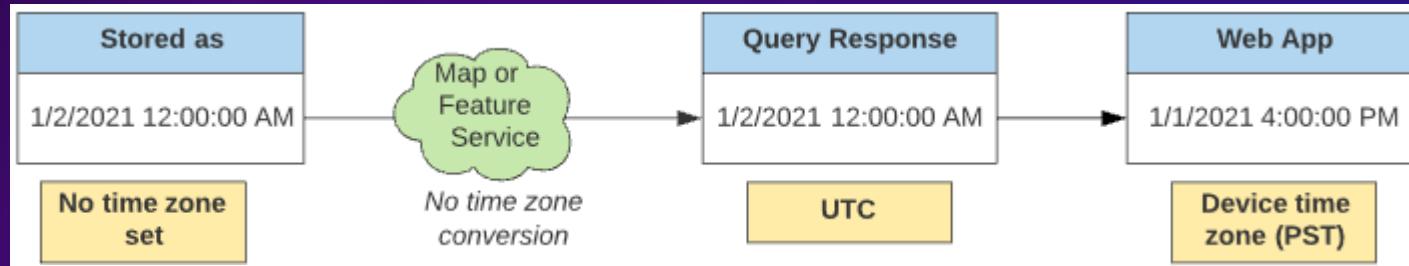


ArcGIS  
Dashboard  
app



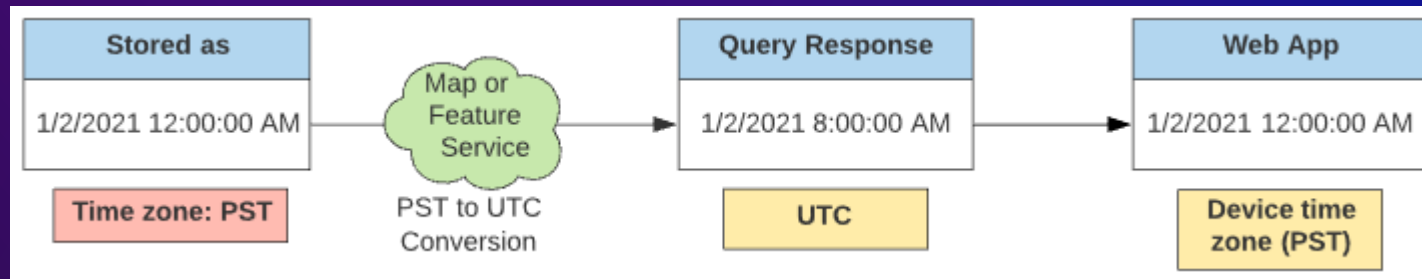
## Solution: set time zone

Time zone  
NOT set



Date/time values in REST API are in UTC  
- with one exception

Time zone  
= PST





# Wrap up

- **Setting time zone**
  - Make sure to install ArcGIS Server Date Fields Performance Improvement [Patch](#)
- **Preferred time zone (  $\geq 10.9$  )**
  - **Supported by:**
    - Map service and feature service (both hosted and non hosted)
  - **Authoring tool:**
    - ArcGIS Manager
    - Admin API (*for hosted feature services*)
- **Unknown time zone**
  - Date time as-is
  - **Supported by:**
    - Enterprise services
    - ArcGIS Pro (2.7 or above)





# We want your feedback

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below this video window



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