Dynamics 365

Connected Field Service (CFS)

Documentation

Contributors

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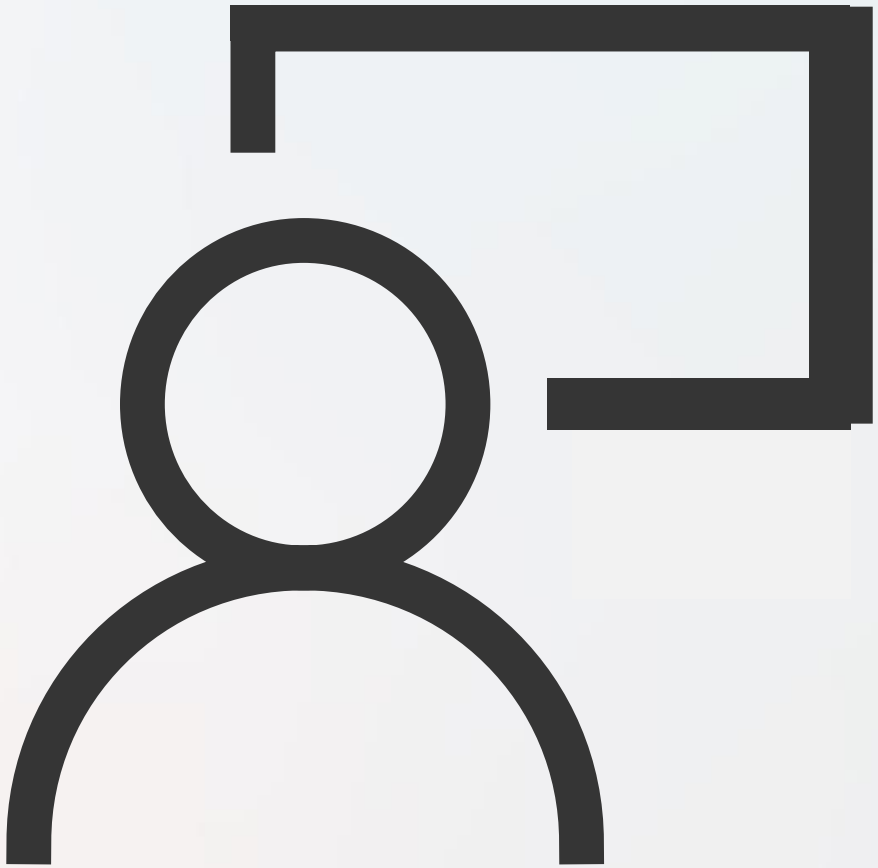
Dynamics 365 for Field Service

Azure IoT

Content *all in progress*

- CFS Architecture
- Azure
  - App Service
    - API Connection
    - Web App
  - Storage
  - IoT Hub
  - Stream Analytics
  - Logic Apps
  - SQL Database
- Dynamics 365
  - Plugins
    - ConnectedFieldService
    - IoTConnector



Version History and Updates

v1.2

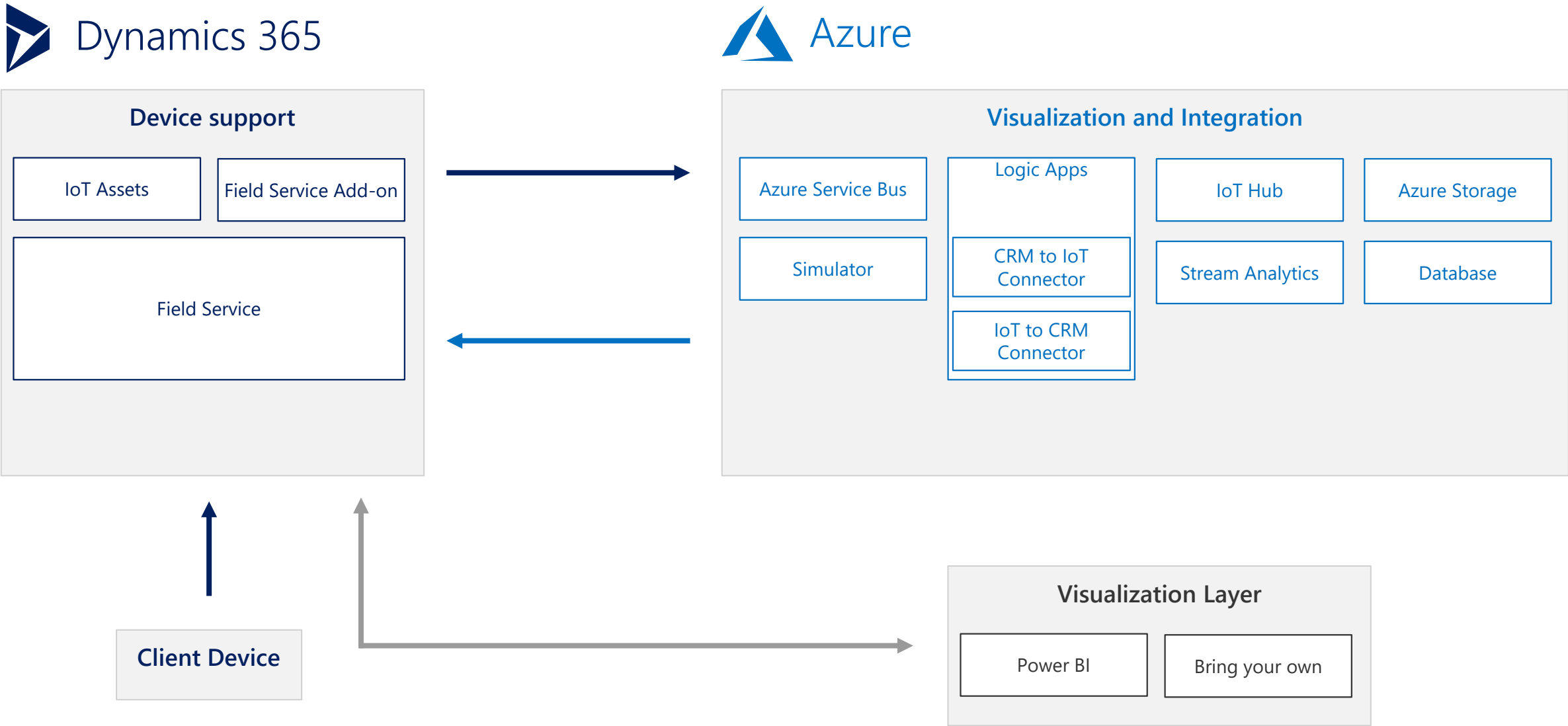
October 5th, 2017

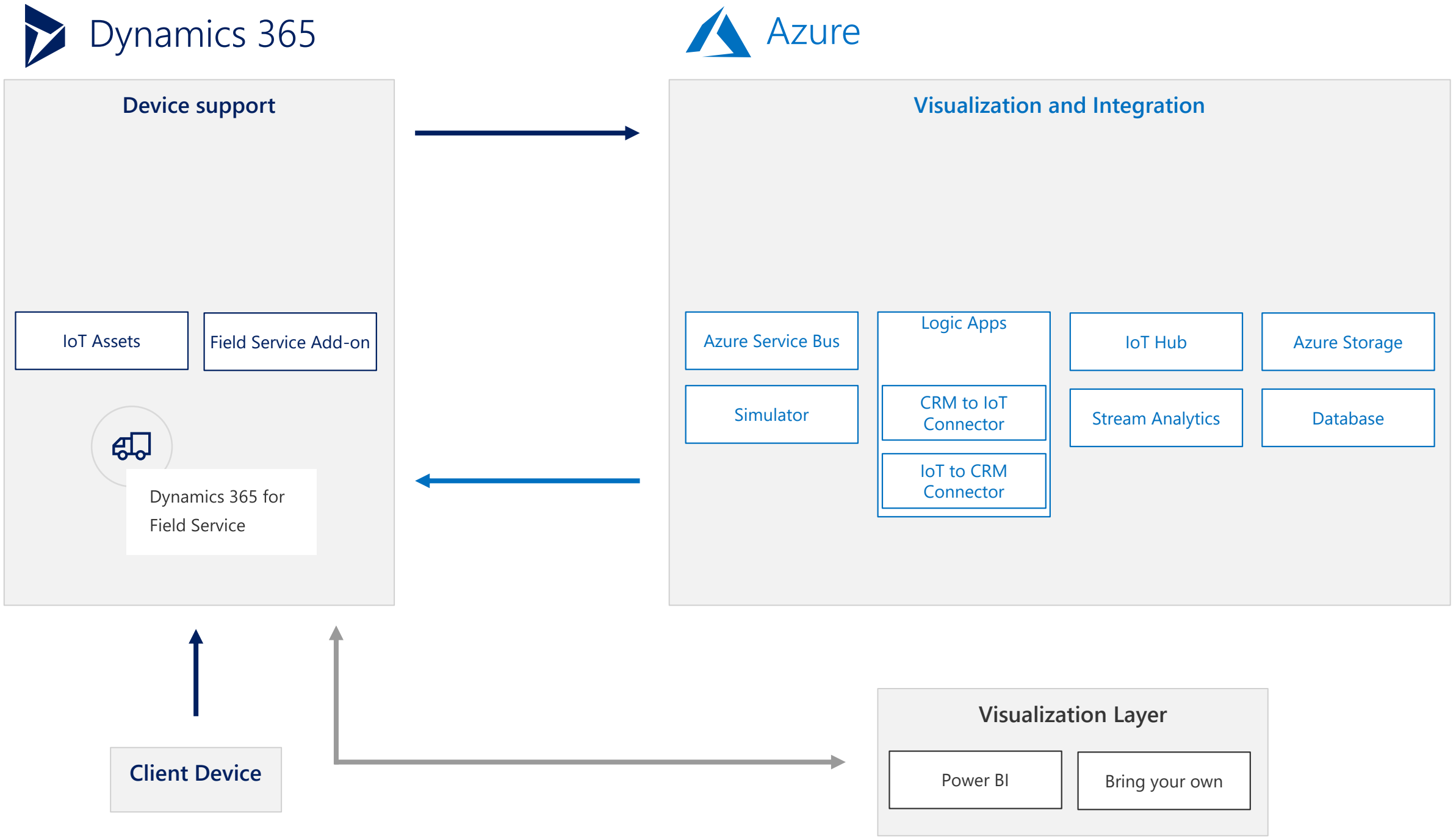
Initial Release

v1.0.18118.1

April 30th, 2018

Upgrade Feature


Dynamics 365
Azure
Device support
IoT Assets
Field Service Add-on
Field Service
Visualization and Integration
Azure Service Bus
Logic Apps
IoT Hub
Azure Storage
Simulator
CRM to IoT Connector
Stream Analytics
Database
IoT to CRM Connector
Client Device
Visualization Layer
Power BI
Bring your own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Bring your own

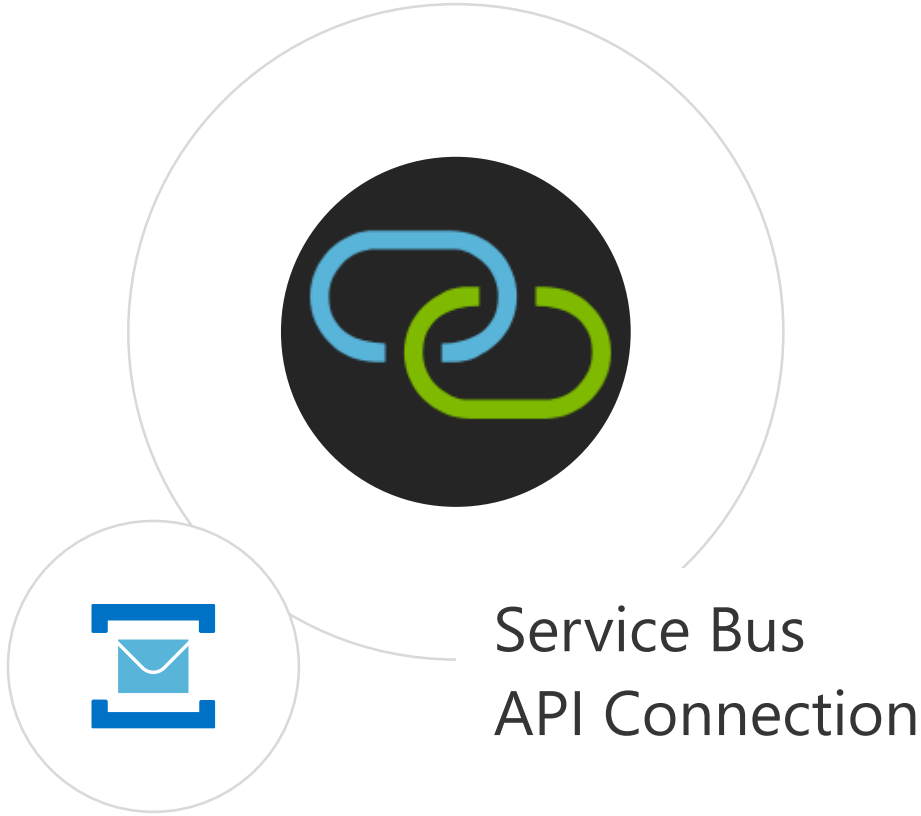
API Connections

API Connections are used to connect Logic Apps or Azure Functions to SaaS services, such as Office 365. It contains information provided when configuring access to a SaaS service.

API CONNECTION

Service Bus

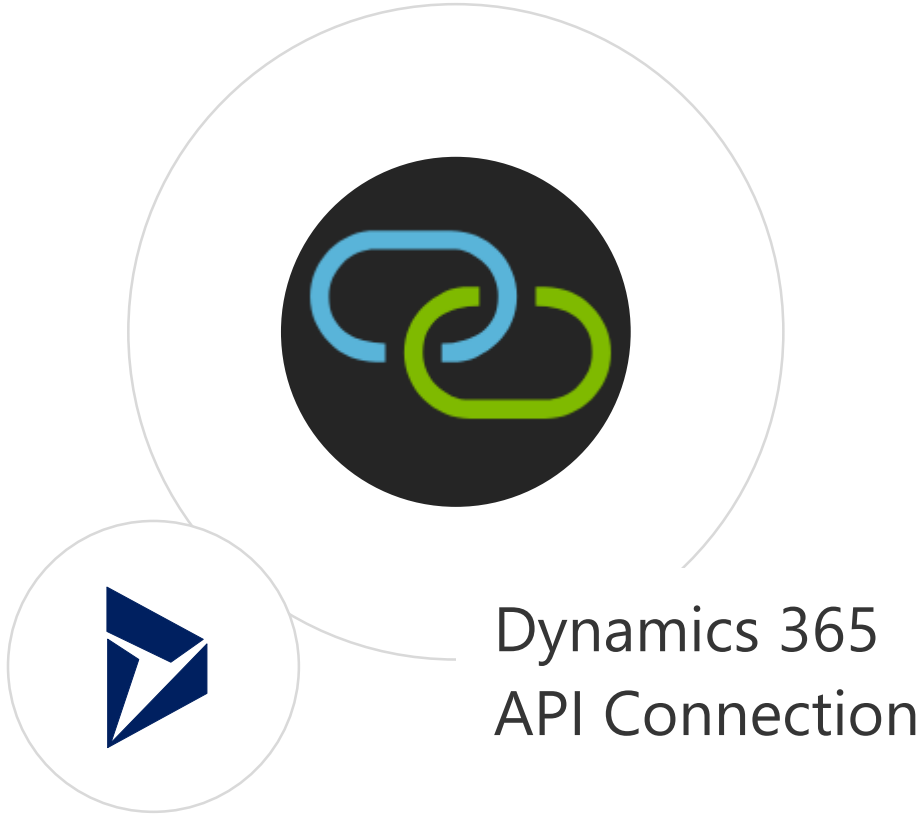
Connect to Azure Service Bus to send and receive messages. You can perform actions such as send to queue, send to topic, receive from queue, receive from subscription, etc.



API CONNECTION

Dynamics 365

Allows us to include a connector in our Logic Apps to generate Dynamics as well receive data from Dynamics.



Azure Storage

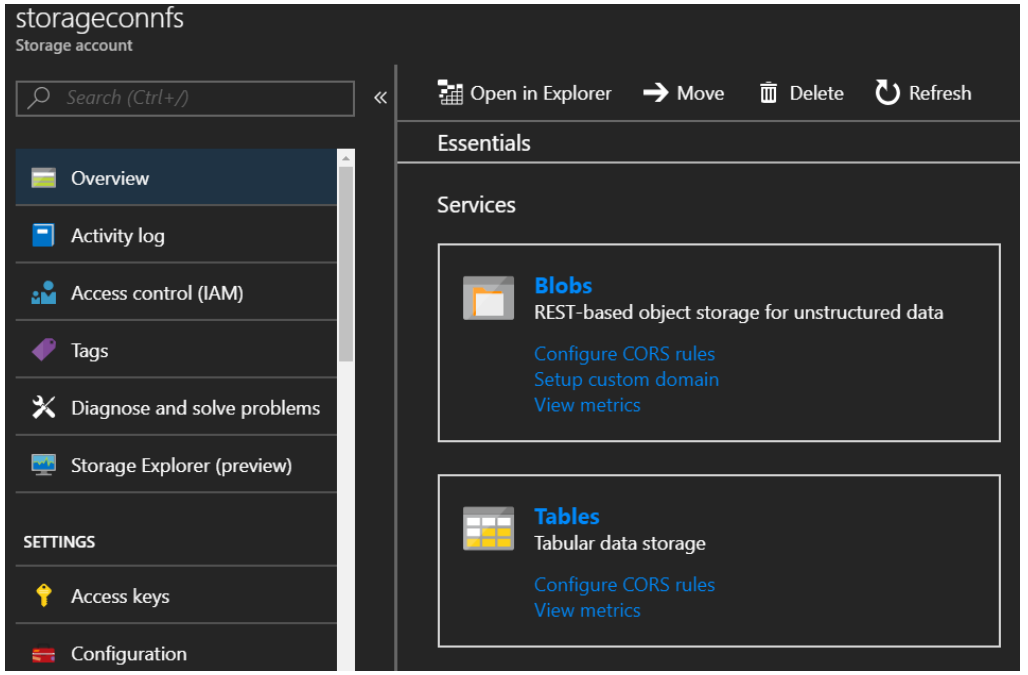
Storage Account DevicerulesBlob

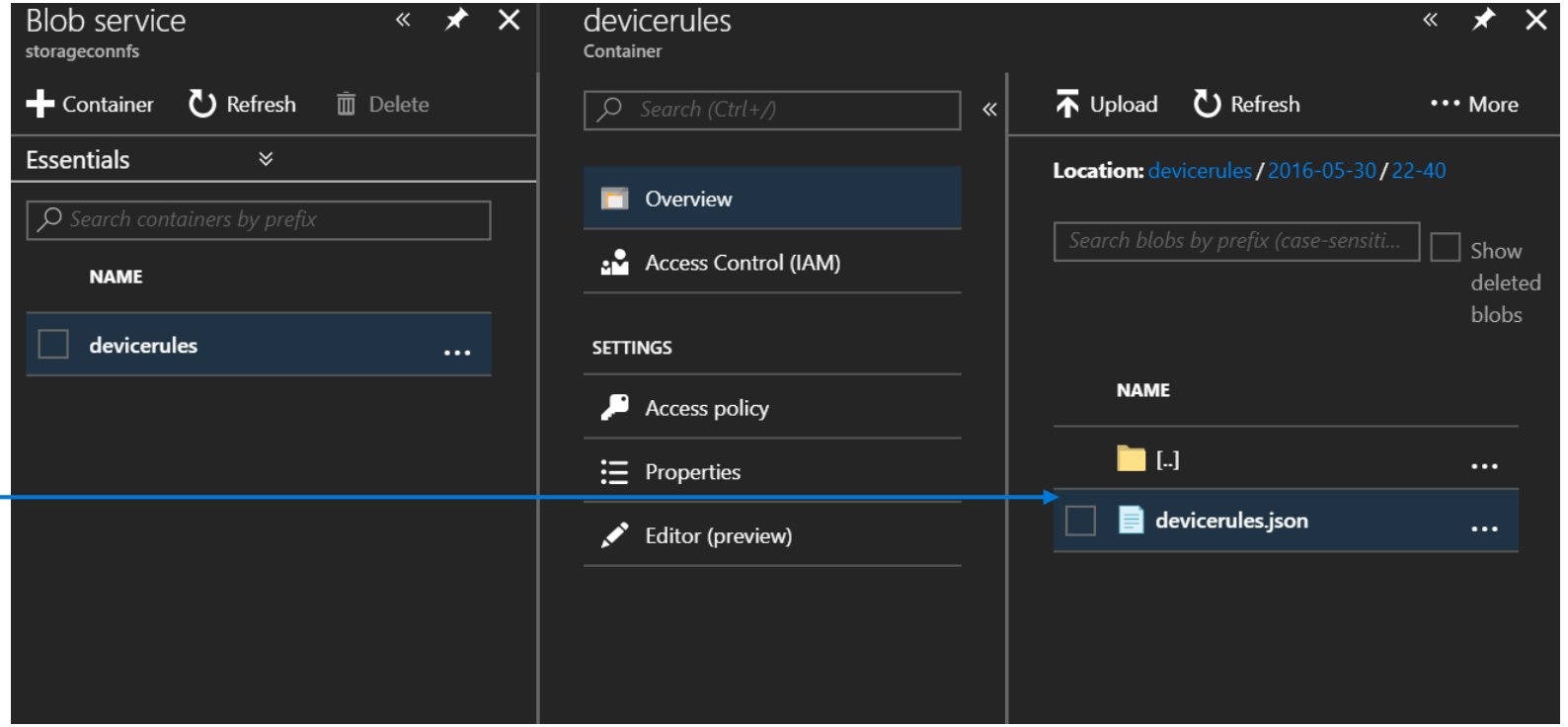
The Storage Account contains only a DevicesRulesBlob.

This Blob has a JSON payload defining our temperature threshold for IoT temperature readings.

devicerules.json

```
[
    {
        "DeviceType": "Thermostat",
        "Temperature": 70.0,
        "Humidity": null,
        "TemperatureRuleOutput": "AlarmTemp",
        "HumidityRuleOutput": null
    }
]
```





CFS LAB 2

App Service Web App

APP SERVICE WEB APP

Thermostat simulator

-

CFS LAB 2

CFS LAB 2

App Service API App

APP SERVICE API APP

App Service CRM Helper

Web service - *verify*?

A custom connector *used internally* in the logic apps to transform data to a desired format so that a record can be updated/created in CRM.

Can say what methods used, say what library dependency in use here (IoT and Xrm SDK)

APP SERVICE API APP

Queue Message Parser

CFS LAB 2

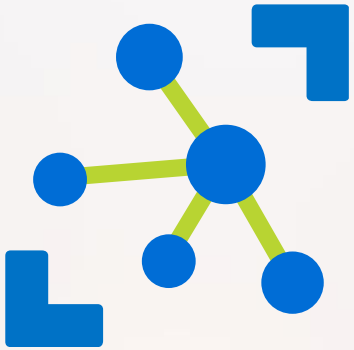
APP SERVICE API APP

App Service IoT Hub Connector

IoT Hub

https://github.com/logicappsio/IoTHubApi/blob/master/IoTHubAPIApp/Controllers/IoTHubController.cs

IoT Hub



IoT Hub in CFS

rgname + unique #

Out Simulator device and MXCHIP device should be registered here.

Service Bus

Service Bus Queue IoT

service-bus-connected-field-service-iot

Bus stores queue messages that are sent to logic apps

Service Bus Queue CRM

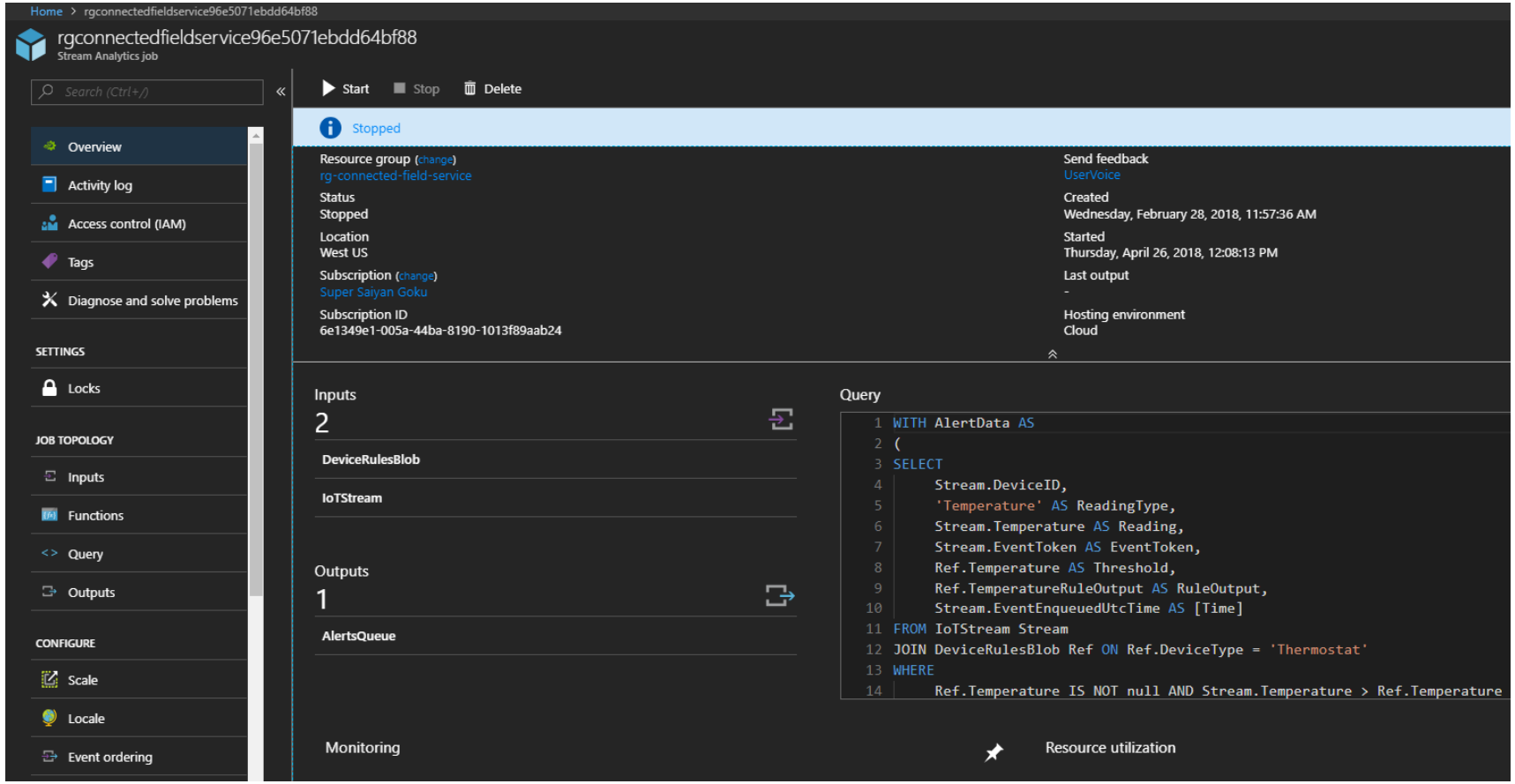
service-bus-connected-field-service-crm

Receives messages from CRM. Thes messages out of the box are for device registration through Dynamics 365.

CFS LAB 2

Azure Stream Analytics

IoT Stream to Alerts Queue



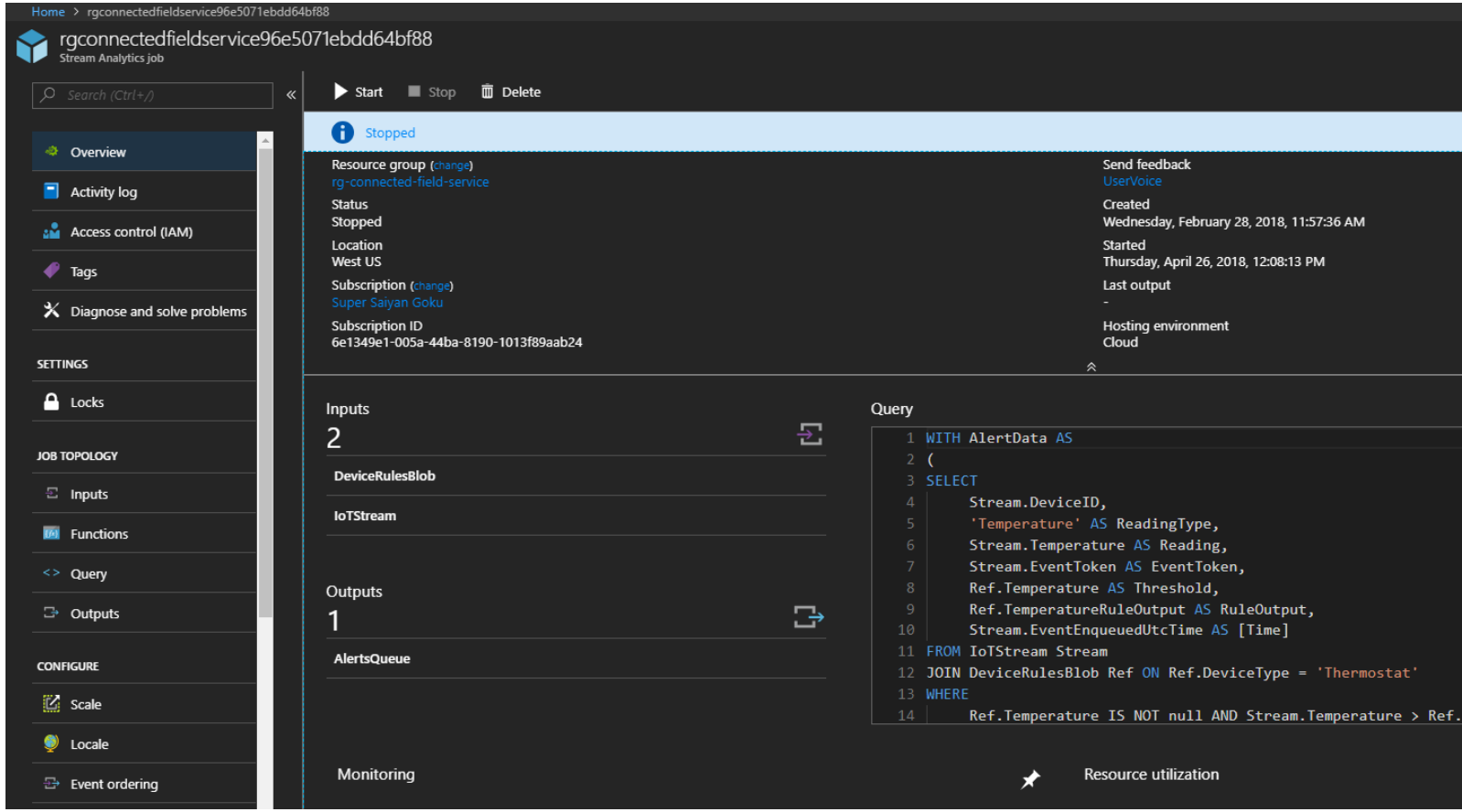
Depends on

- IoT Hub
  - Queue Message Parser
- Storage Account
  - Device Rules Blob
- Service Bus
  - For messages sent to IoT-to-CRM logic app

IoT data using Stream Analytics

The job takes an IoT Stream (Temperature and Humidity data) and DevicesRulesBlob (contains a JSON payload defining our temperature threshold for when to send Alerts) as inputs.

The job sends a message to the AlertsQueue based on the Query and the threshold from the DevicesRulesBlob's devicerules.json file.



Stream Analytics Alert Threshold

Our job takes our IoT Stream (Temperature and Humidity data) as input and a DevicesRulesBlob (contains a JSON payload defining our temperature threshold for when to send Alerts)

Our job sends a message to the AlertsQueue based on our Query and the threshold from our DevicesRulesBlob.

Notice from this we can tell our temperature threshold for this Connected Field Service Add-on solution is `70.0°F` out of the box.

And this threshold is referenced in the `JOIN` to the DevcieRulesBlobm, allowing us to use the `WHERE` clause defining an alert as a temperature from our IoT Hub data stream

STREAM ANALYTICS QUERY

```
WITH AlertData AS
(
SELECT
      Stream.DeviceID,
      'Temperature' AS ReadingType,
      Stream.Temperature AS Reading,
      Stream.EventToken AS EventToken,
      Ref.Temperature AS Threshold,
      Ref.TemperatureRuleOutput AS RuleOutput,
      Stream.EventEnqueuedUtcTime AS [Time]
FROM IoTStream Stream
     JOIN DeviceRulesBlob Ref ON Ref.DeviceType = 'Thermostat'
WHERE
     Ref.Temperature IS NOT null AND Stream.Temperature > Ref.Temperature
)

SELECT data.DeviceId,
      data.ReadingType,
      data.Reading,
      data.EventToken,
      data.Threshold,
      data.RuleOutput,
      data.Time
INTO AlertsQueue
FROM AlertData data
WHERE LAG(data.DeviceID) OVER (PARTITION BY data.DeviceId, data.Reading,
data.ReadingType LIMIT DURATION(minute, 1)) IS NULL
```

DEVICE RULES JSON

```
[
      {
            "DeviceType":"Thermostat",
            "Temperature":70.0,
            "Humidity":null,
            "TemperatureRuleOutput":"AlarmTemp",
            "HumidityRuleOutput":null
      }
]
```

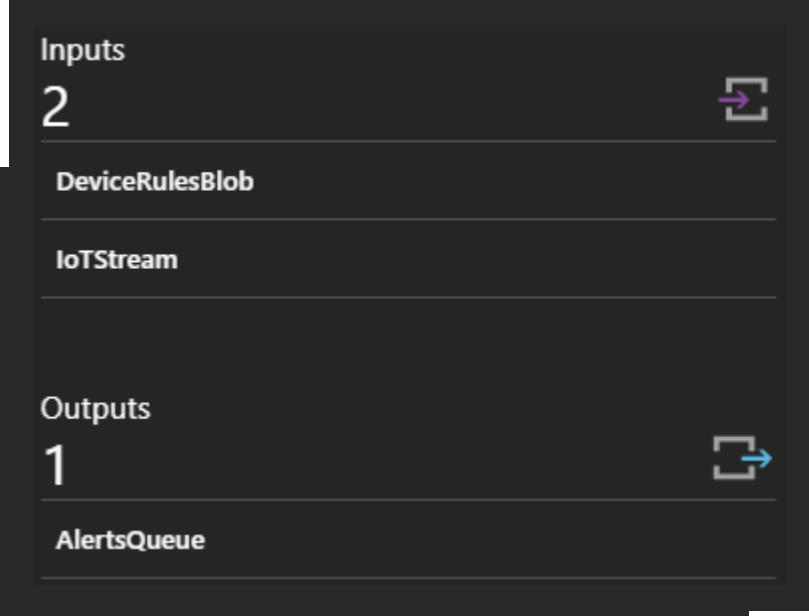
STREAM ANALYTICS

IoT Stream to Alerts Queue

rgconnectedfieldservice96e5071ebdd64bf88

AlertsQueue

Where the threshold rule is configured – this is what determines what is an alert and worth sending to CRM.



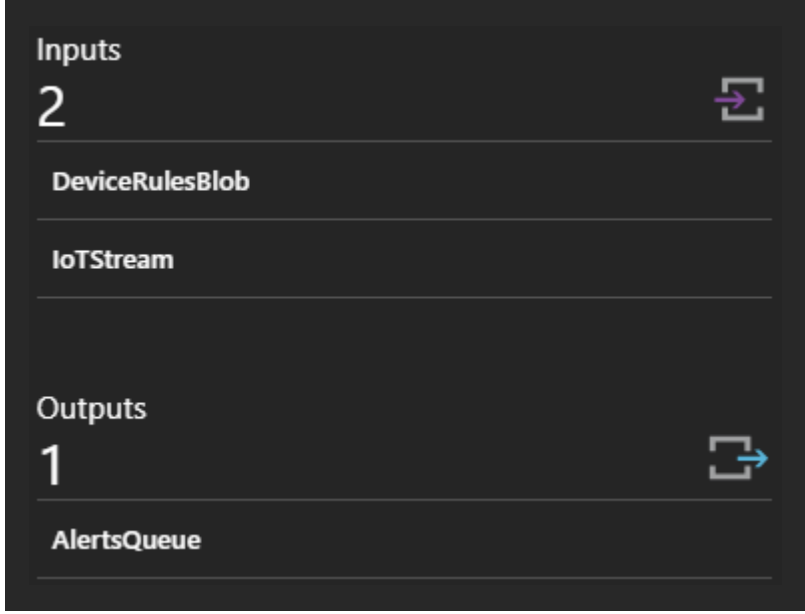

```
WITH AlertData AS
(
SELECT
Stream.DeviceID,
'Temperature' AS ReadingType,
Stream.Temperature AS Reading,
Stream.EventToken AS EventToken,
Ref.Temperature AS Threshold,
Ref.TemperatureRuleOutput AS RuleOutput,
Stream.EventEnqueuedUtcTime AS [Time]
FROM IoTStream Stream
JOIN DeviceRulesBlob Ref ON Ref.DeviceType = 'Thermostat'
WHERE
Ref.Temperature IS NOT null AND Stream.Temperature > Ref.Temperature
)

SELECT data.DeviceId,
data.ReadingType,
data.Reading,
data.EventToken,
data.Threshold,
data.RuleOutput,
data.Time
INTO AlertsQueue
FROM AlertData data
WHERE LAG(data.DeviceID) OVER (PARTITION BY data.DeviceId, data.Reading,
data.ReadingType LIMIT DURATION(minute, 1)) IS NULL
```

STREAM ANALYTICS

IoT Stream to Alerts Queue Inputs

Device rules JSON from blob

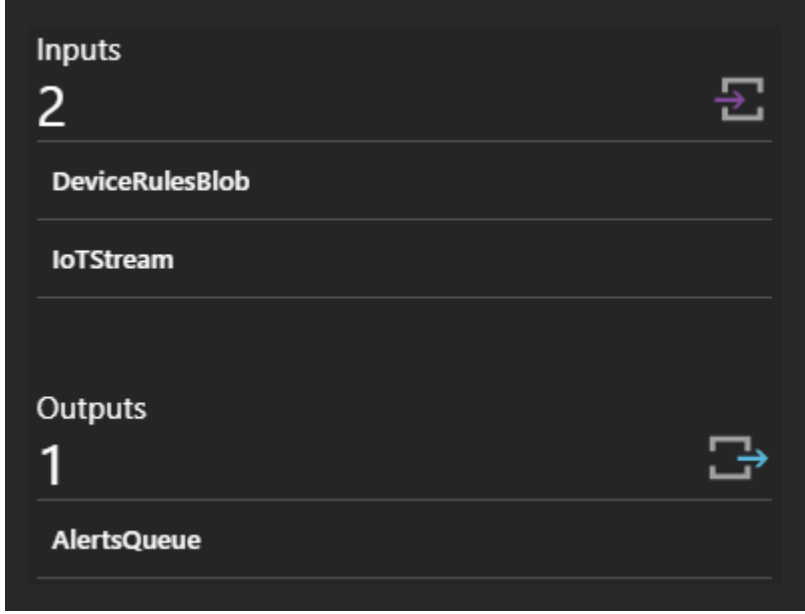
IoT Stream



STREAM ANALYTICS

IoT Stream to Alerts Queue Outputs

-



IoT Stream to Power BI

Depends on

API Apps

- Queue Message Parser

STREAM ANALYTICS

IoT Stream to PowerBI

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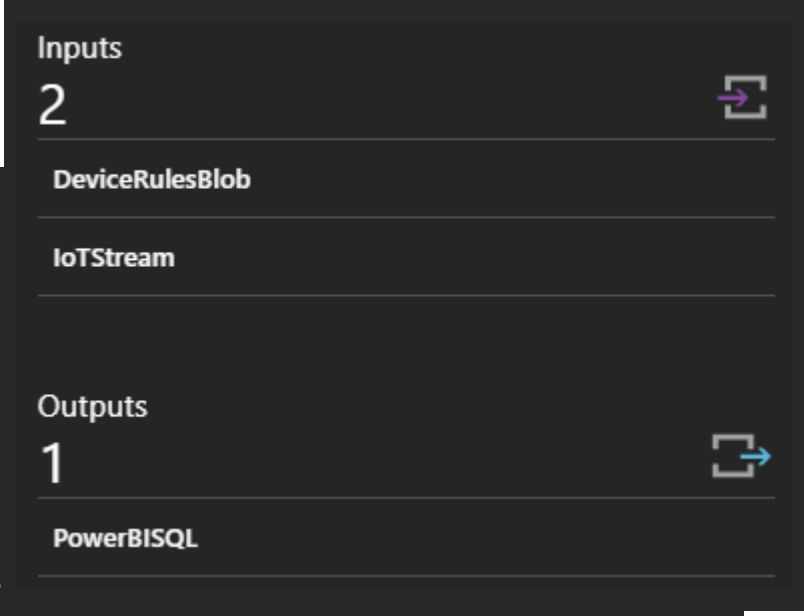
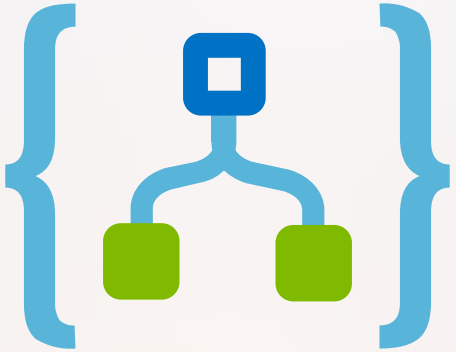
PowerBI SQL

Optionally deployed to send telemetry to SQL DB which is used for PowerBI visualizations of the device health.

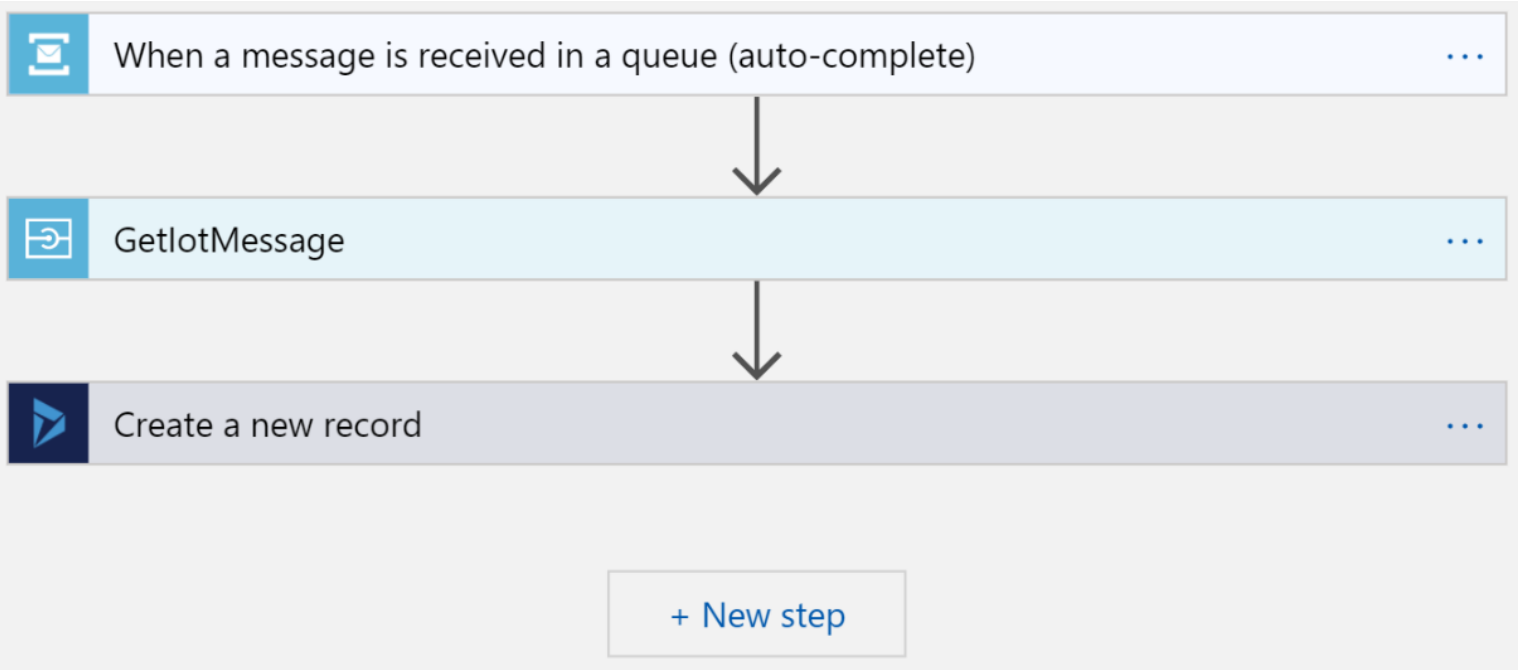
```
WITH TelemetryData AS
(
SELECT
Stream.DeviceID,
'Temperature' AS ReadingType,
Stream.Temperature AS Reading,
Stream.EventToken AS EventToken,
Ref.Temperature AS Threshold,
Ref.TemperatureRuleOutput AS RuleOutput,
Stream.EventEnqueuedUtcTime AS [Time]
FROM IoTStream Stream
JOIN DeviceRulesBlob Ref ON Ref.DeviceType = 'The
),
MaxInMinute AS
(
SELECT
TopOne() OVER (ORDER BY Reading DESC) AS telemetryEvent
FROM
TelemetryData
GROUP BY
TumblingWindow(minute, 1), DeviceId
)

SELECT telemetryEvent.DeviceId,
telemetryEvent.ReadingType,
telemetryEvent.Reading,
telemetryEvent.EventToken,
telemetryEvent.Threshold,
telemetryEvent.RuleOutput,
telemetryEvent.Time
INTO PowerBISQL
FROM MaxInMinute
```



Logic Apps



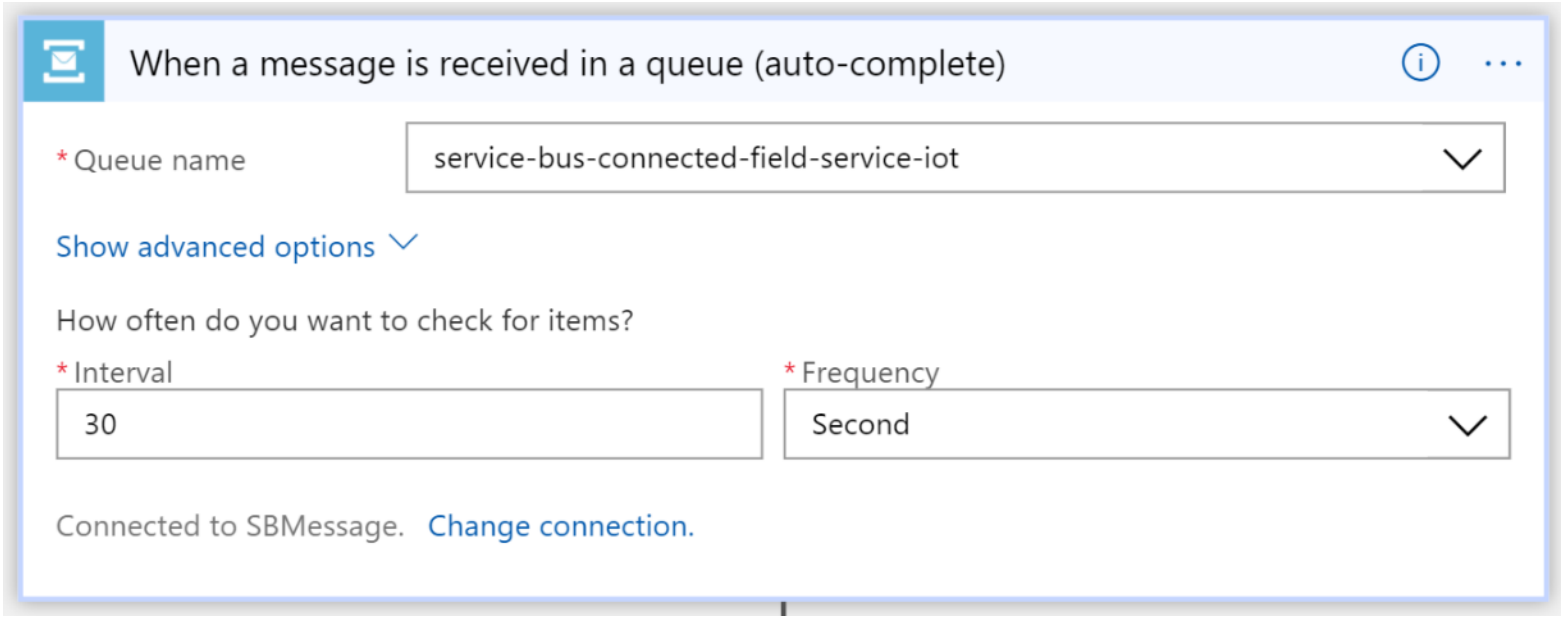
Logics Apps IoT to CRM



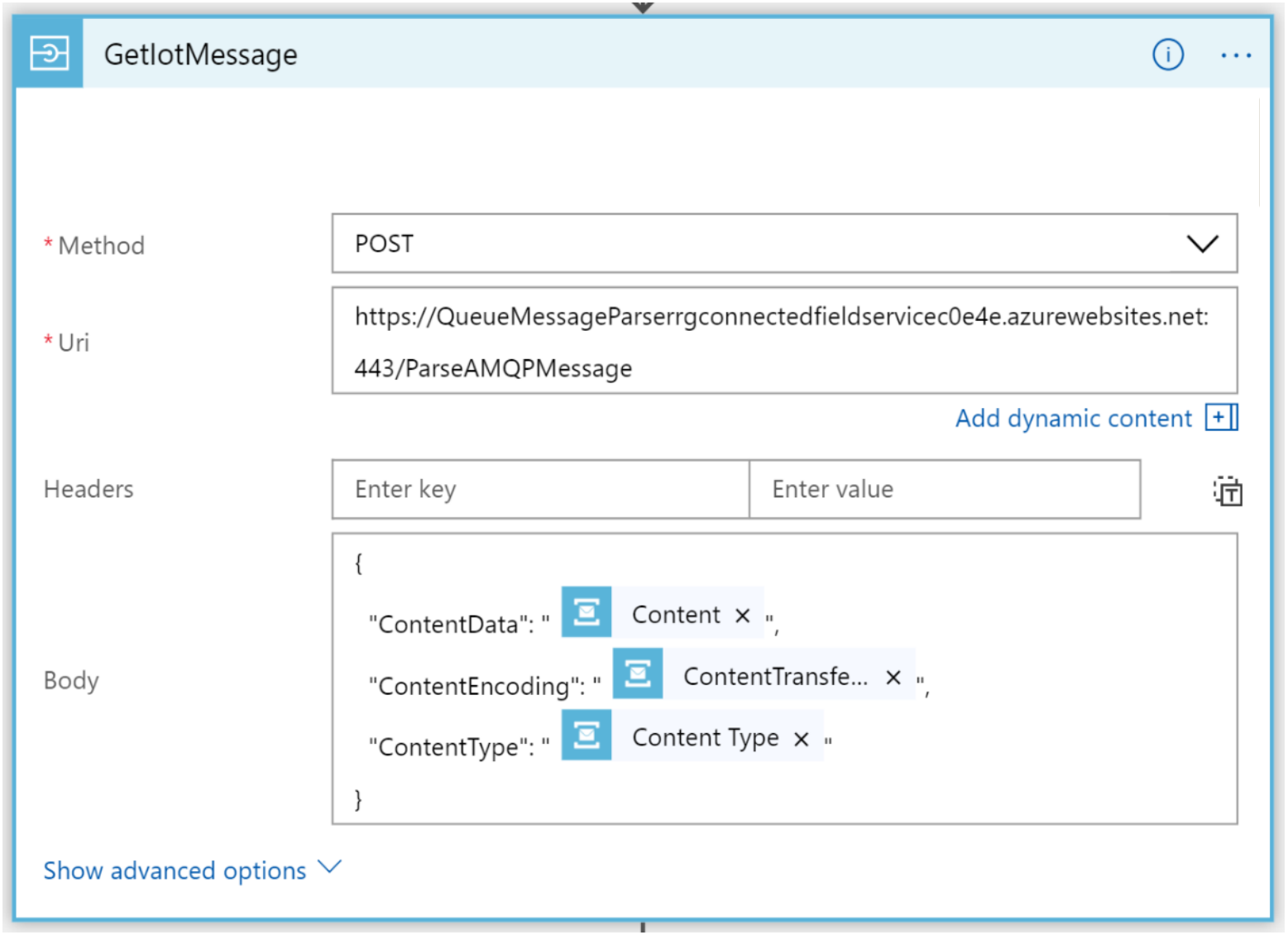
Depends on

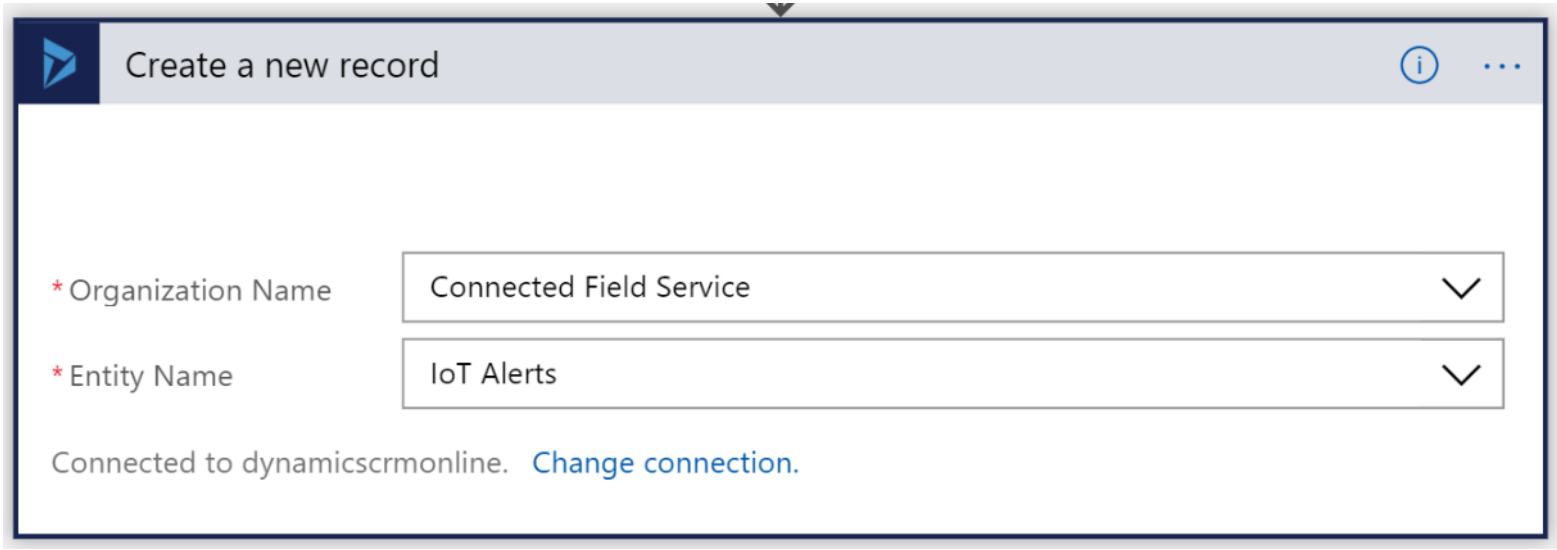
API Apps

- Queue Message Parser

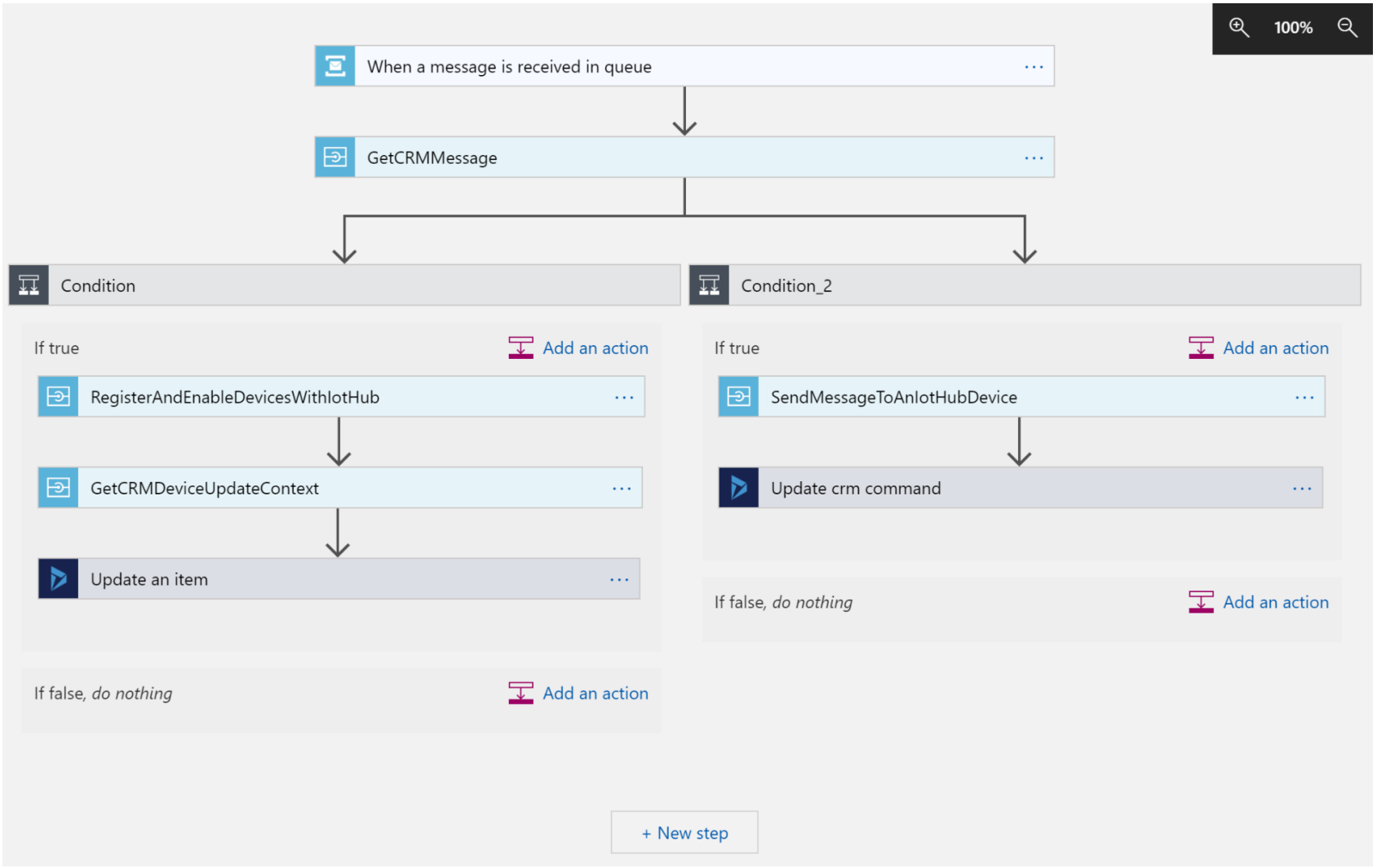

When a message is received in a queue (auto-complete)
* Queue name
service-bus-connected-field-service-iot
Show advanced options
How often do you want to check for items?
* Interval
30
* Frequency
Second
Connected to SBMessage.
Change connection.

Uses QueueMessageParser API App



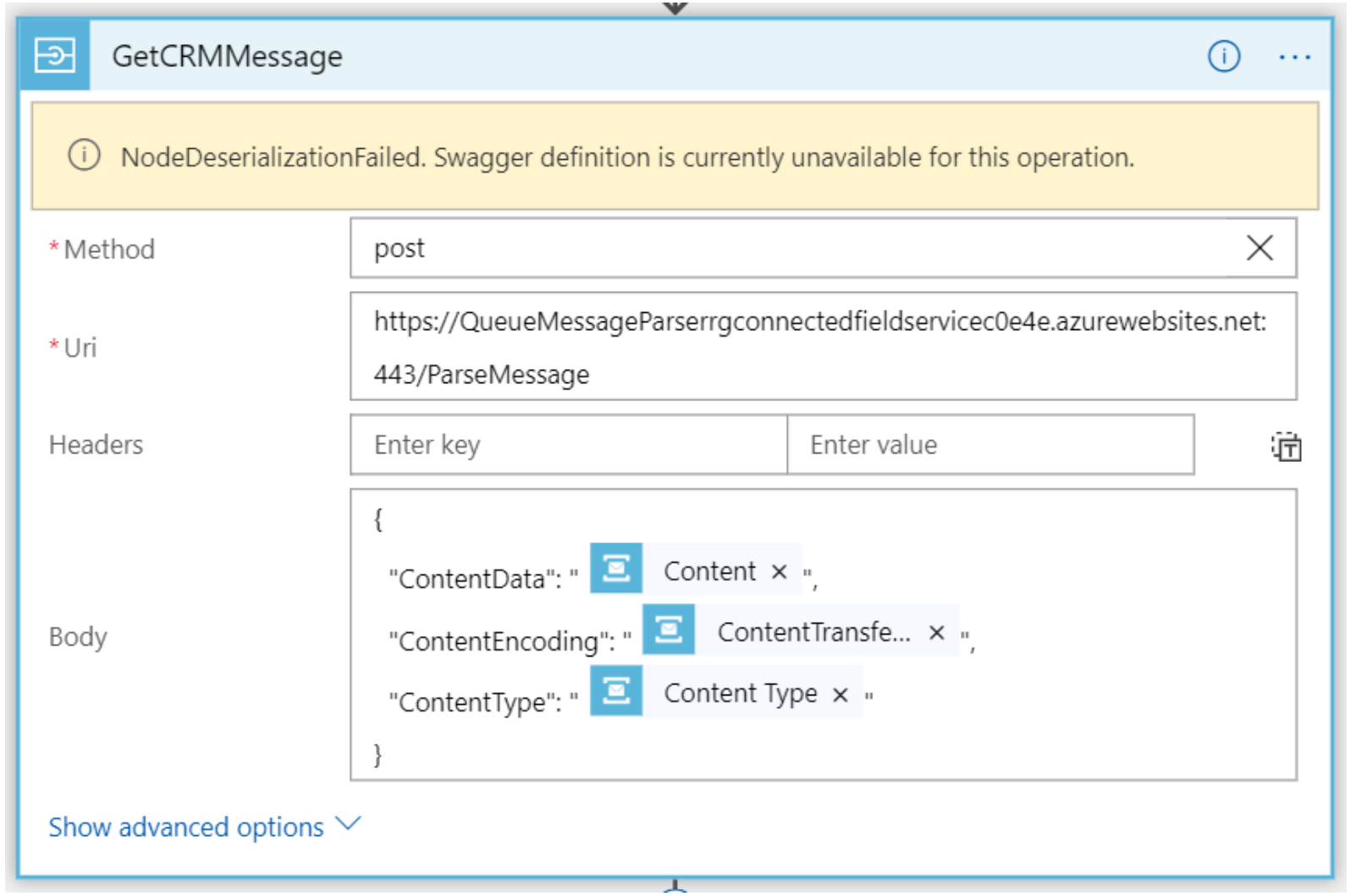

Create a new record
* Organization Name
Connected Field Service
* Entity Name
IoT Alerts
Connected to dynamicscrmonline.
Change connection.

Logics Apps CRM to IoT

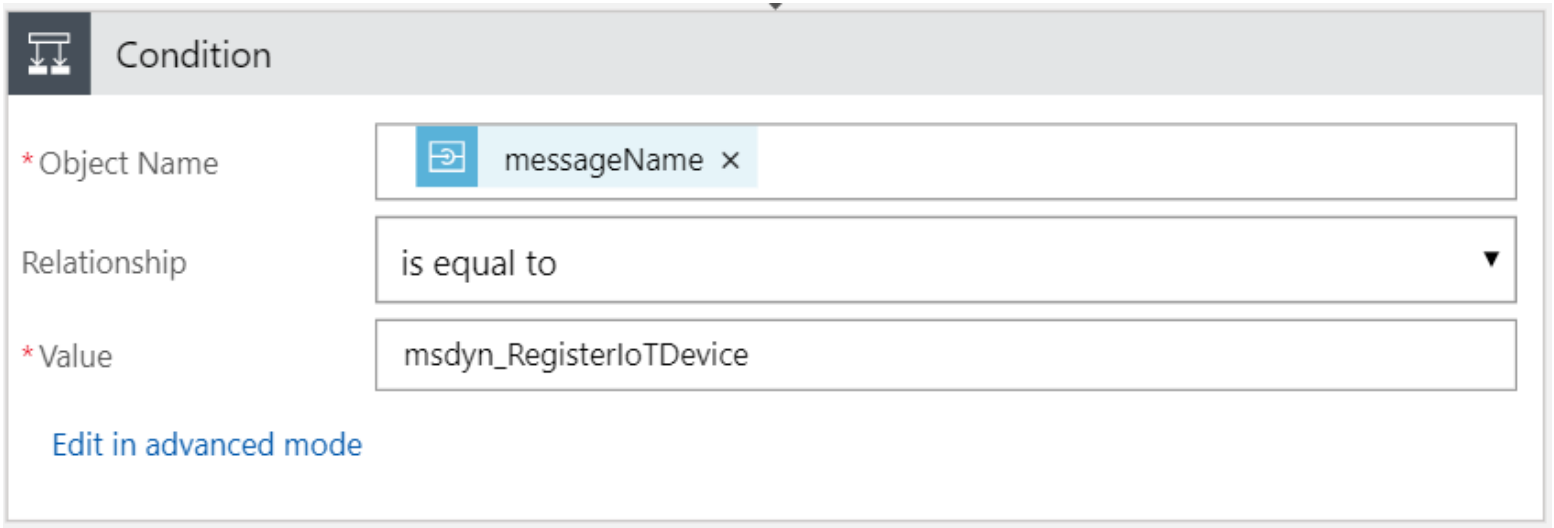


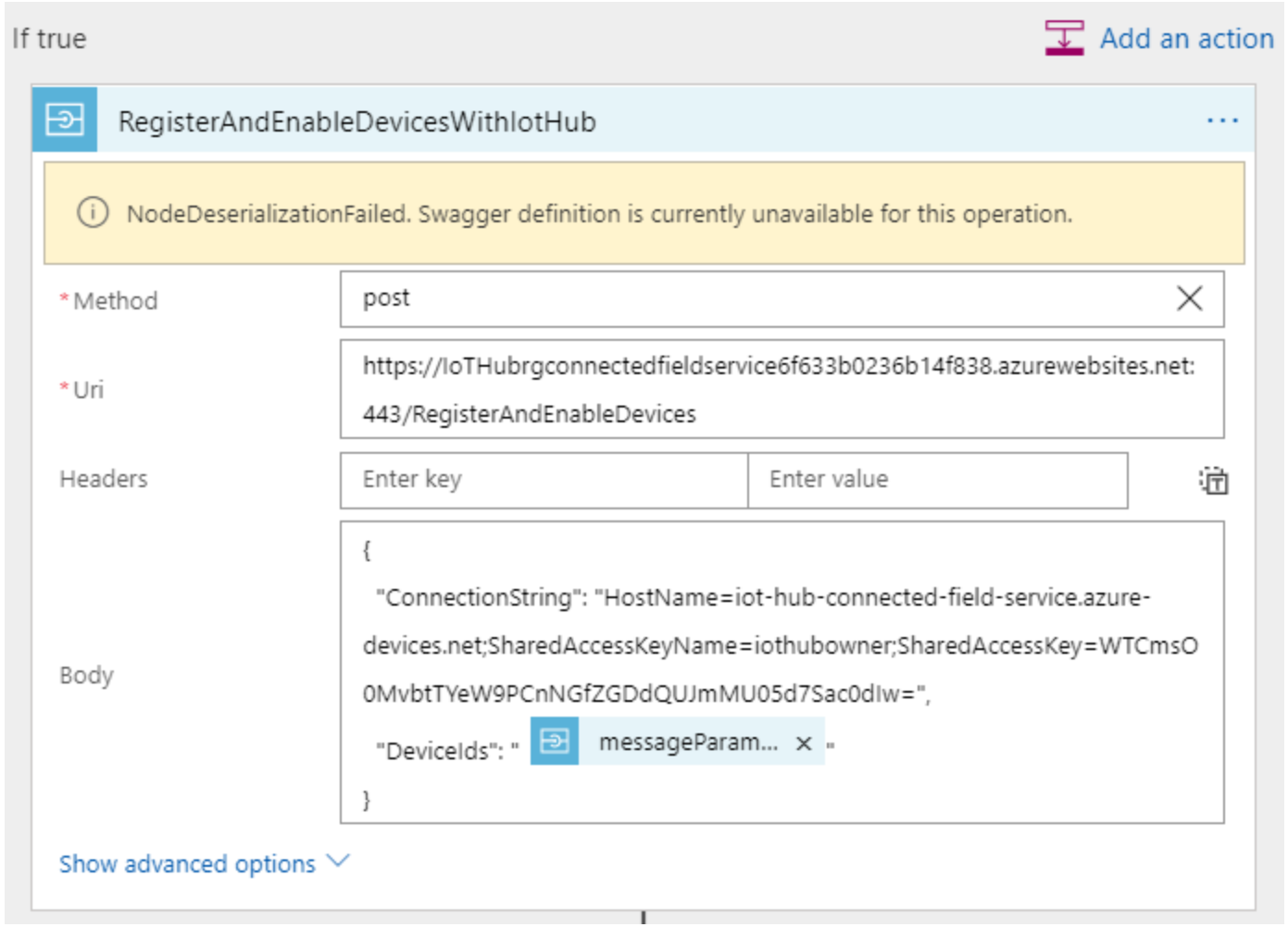
Depends on

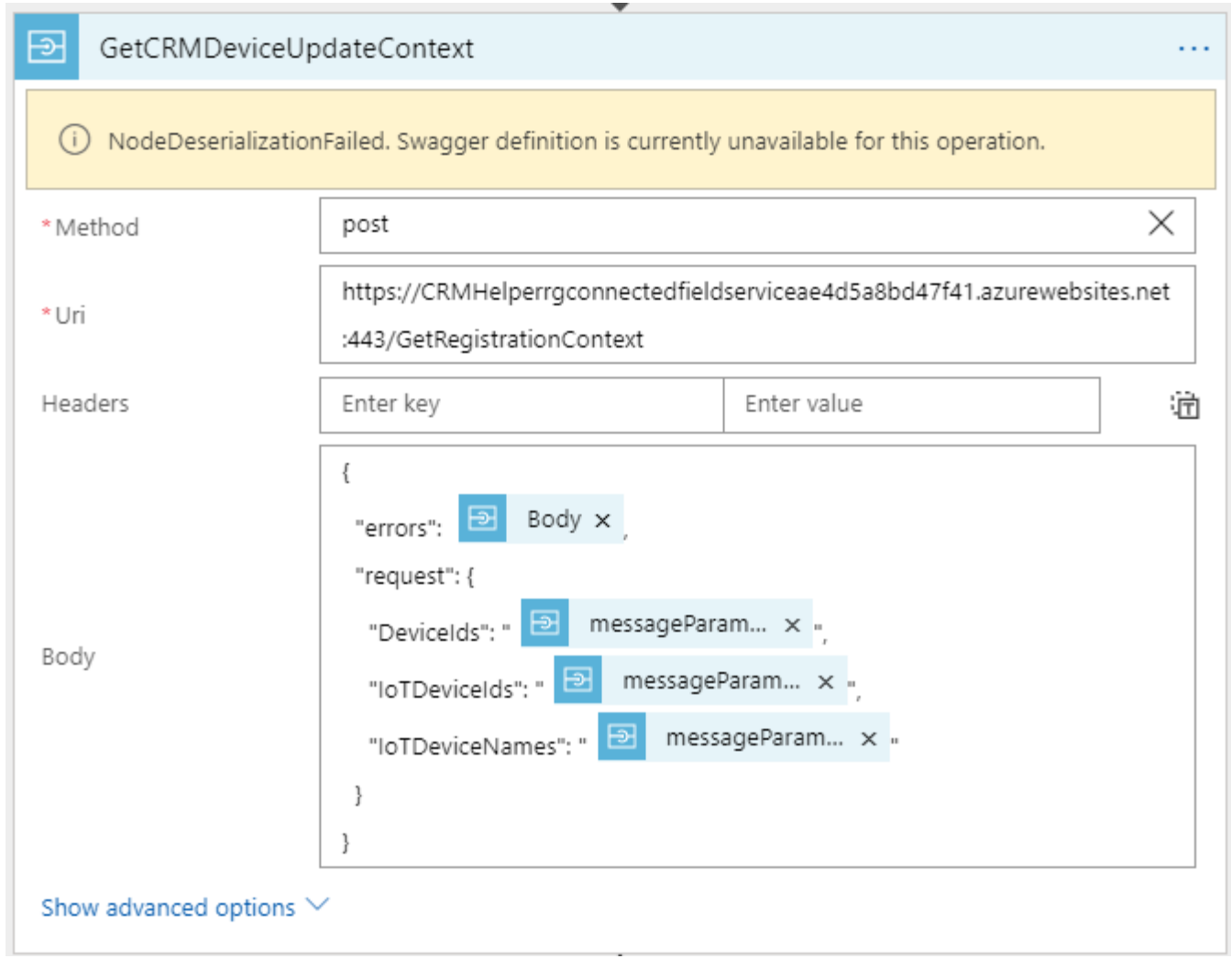
- API Apps
  - Queue Message Parser
  - IoT Hub
  - CRM Helper


GetCRMMessage
NodeDeserializationFailed. Swagger definition is currently unavailable for this operation.
* Method
post
* Uri
https://QueueMessageParserrgconnectedfieldservicec0e4e.azurewebsites.net:443/ParseMessage
Headers
Enter key
Enter value
Body
{
"ContentData": "
Content
",
"ContentEncoding": "
ContentTransfe...
",
"ContentType": "
Content Type
"
}
Show advanced options

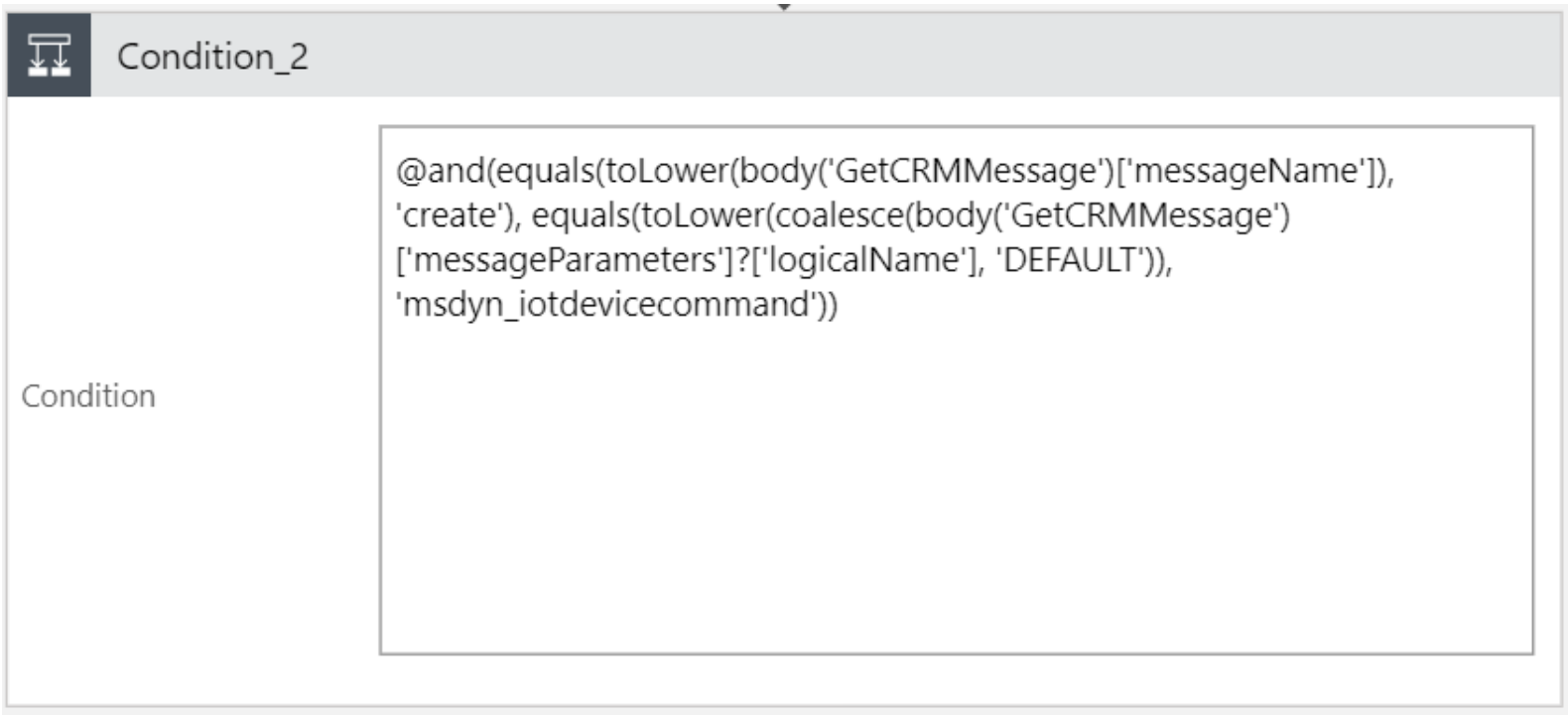
Condition

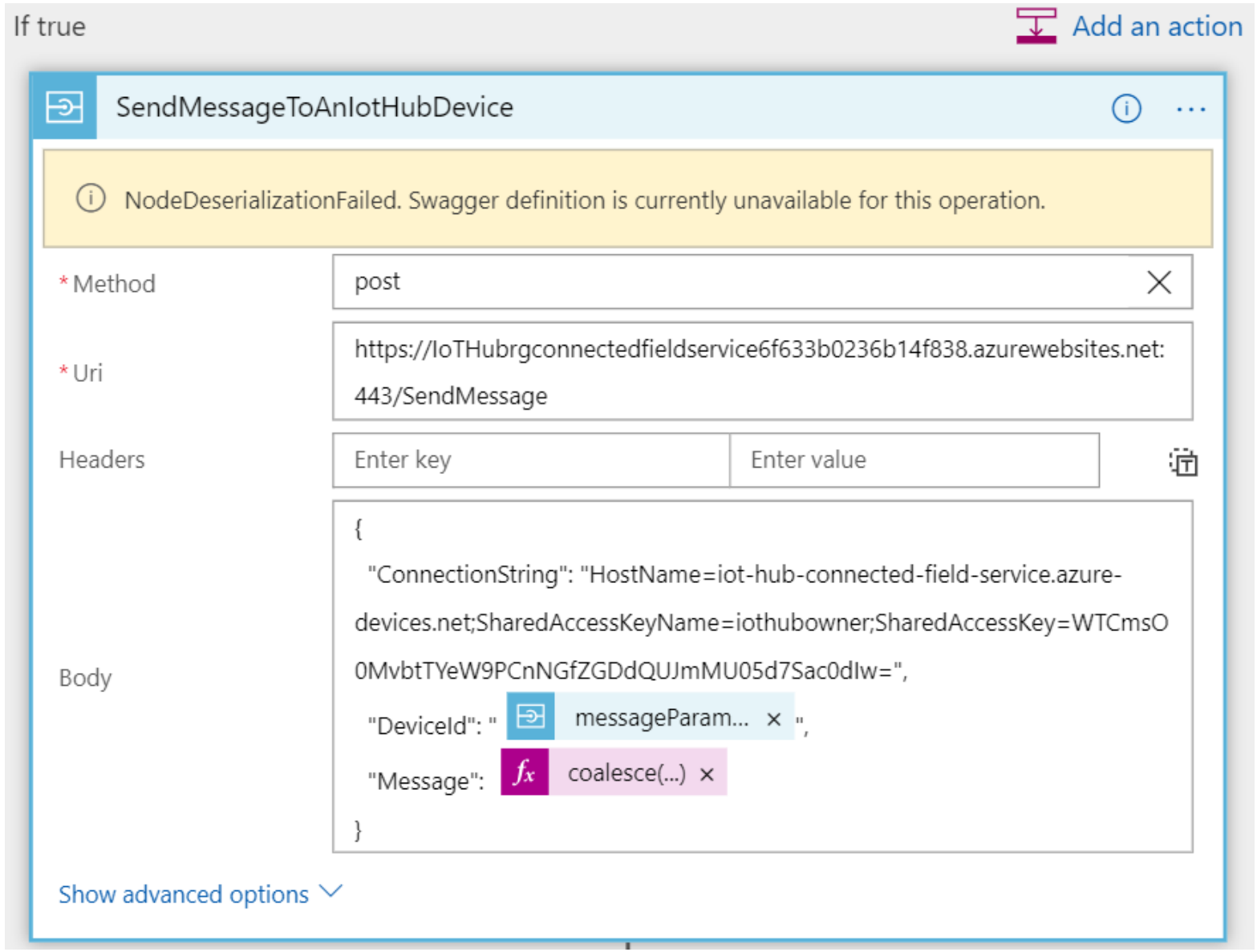

Condition
* Object Name
messageName ×
Relationship
is equal to
* Value
msdyn_RegisterIoTDevice
Edit in advanced mode

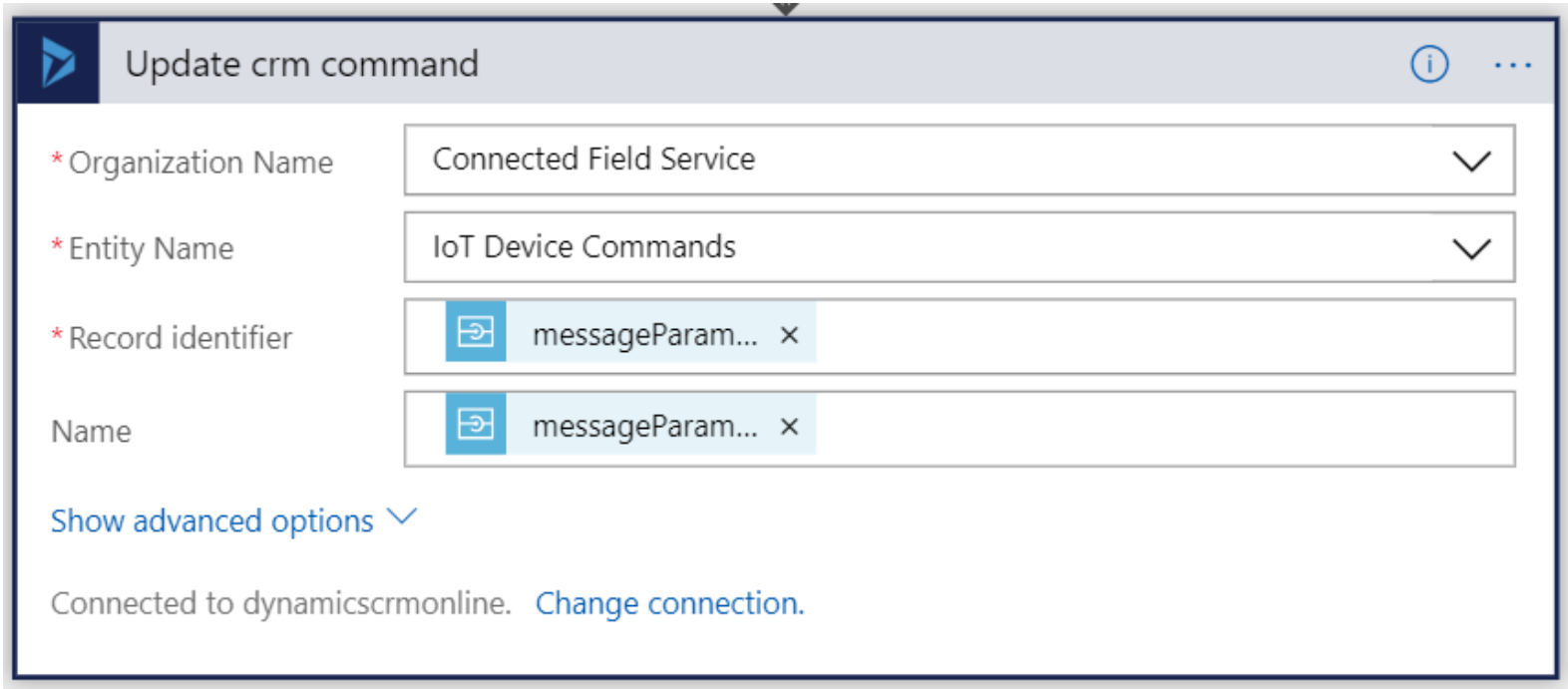

If true
Add an action
RegisterAndEnableDevicesWithIotHub
NodeDeserializationFailed. Swagger definition is currently unavailable for this operation.
* Method
post
* Uri
https://IoTHubrgconnectedfieldservice6f633b0236b14f838.azurewebsites.net:443/RegisterAndEnableDevices
Headers
Enter key
Enter value
Body
{
"ConnectionString": "HostName=iot-hub-connected-field-service.azure-devices.net;SharedAccessKeyName=iothubowner;SharedAccessKey=WTCmsO0MvbtTYeW9PCnNGfZGDdQUJmMU05d7Sac0dIw=",
"DeviceIds": "
messageParam...
"
}
Show advanced options


GetCRMDeviceUpdateContext
NodeDeserializationFailed. Swagger definition is currently unavailable for this operation.
* Method
post
* Uri
https://CRMHelperrgconnectedfieldserviceae4d5a8bd47f41.azurewebsites.net
:443/GetRegistrationContext
Headers
Enter key
Enter value
Body
{
"errors":
Body
,
"request": {
"DeviceIds": "
messageParam...
",
"IoTDeviceIds": "
messageParam...
",
"IoTDeviceNames": "
messageParam...
"
}
}
Show advanced options

Condition_2


Condition_2
Condition
@and(equals(toLower(body('GetCRMMessage')['messageName']),
'create'), equals(toLower(coalesce(body('GetCRMMessage')
['messageParameters']?['logicalName'], 'DEFAULT')),
'msdyn_iotdevicecommand'))


If true
Add an action
SendMessageToAnIotHubDevice
NodeDeserializationFailed. Swagger definition is currently unavailable for this operation.
* Method
post
* Uri
https://IoTHubrgconnectedfieldservice6f633b0236b14f838.azurewebsites.net:443/SendMessage
Headers
Enter key
Enter value
Body
{
"ConnectionString": "HostName=iot-hub-connected-field-service.azure-devices.net;SharedAccessKeyName=iothubowner;SharedAccessKey=WTCmsO0MvbtTYeW9PCnNGfZGDdQUJmMU05d7Sac0dIw=",
"DeviceId": "
messageParam...
",
"Message":
coalesce(...)
}
Show advanced options


Update crm command
* Organization Name
Connected Field Service
* Entity Name
IoT Device Commands
* Record identifier
messageParam...
Name
messageParam...
Show advanced options
Connected to dynamicscrmonline.
Change connection.

App Service & Plan

App Service Simulator web app

CFS LAB 2

App Service Plan

SQL Server & Database

SQL Server and Database

The SQL DB is hosted on our SQL Server

Telemetry to this SQL DB is used for PowerBI visualizations of the device health.