



# Forge Data Days

Tokyo – 29 July 2022

Takehiro Kato, Developer Advocate



# Fusion Data API

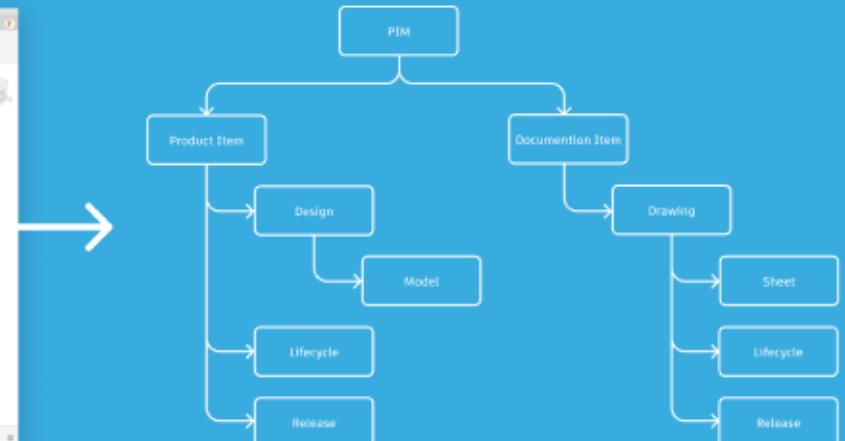
Takehiro Kato  
Developer Advocate

# Fusion Data API

## 概要

クラウド上の製造設計データ

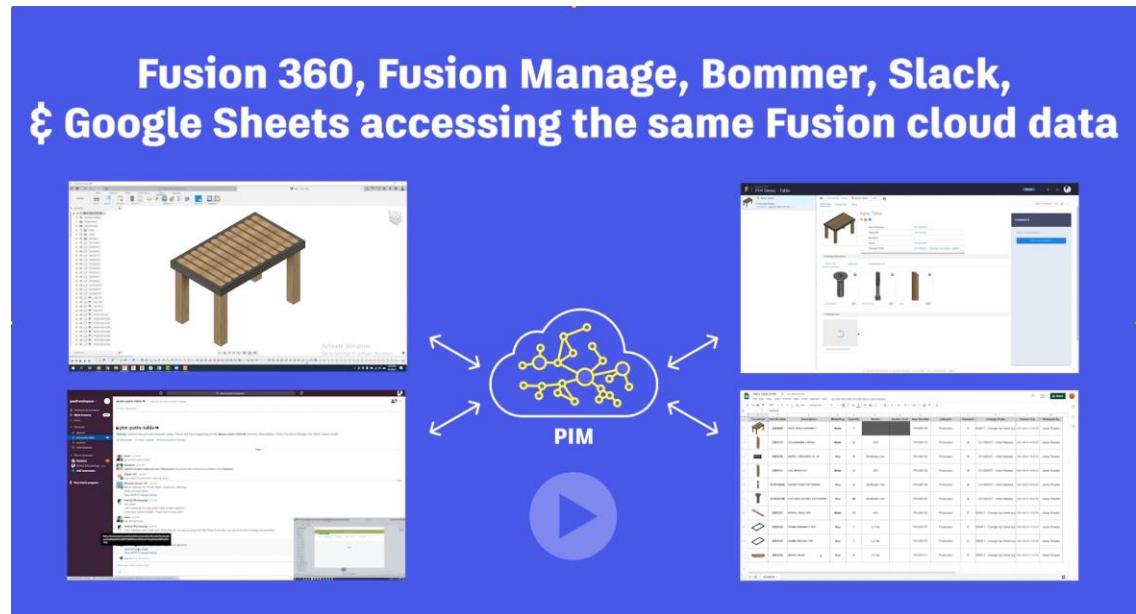
- 粒状化データ
- 容易なアクセス
- データの取得・書き込み・拡張



# Fusion Data API

## 概要

クラウド上の製造設計データ信頼できる情報源



# Fusion Data API

## 機能

- Data Management API access  
(hubs/projects/folders/files/versions)



- モデルプロパティ
- モデルの階層
- ライフサイクルプロパティ
- サムネイル画像 (内部コンポーネントを含む)
- イベント (webhooksのような)



The screenshot shows a software interface titled "PROPERTIES" for a component named "Steering Wheel Assembly -- FoFD1". The dialog is divided into sections: "General" and "Manage".

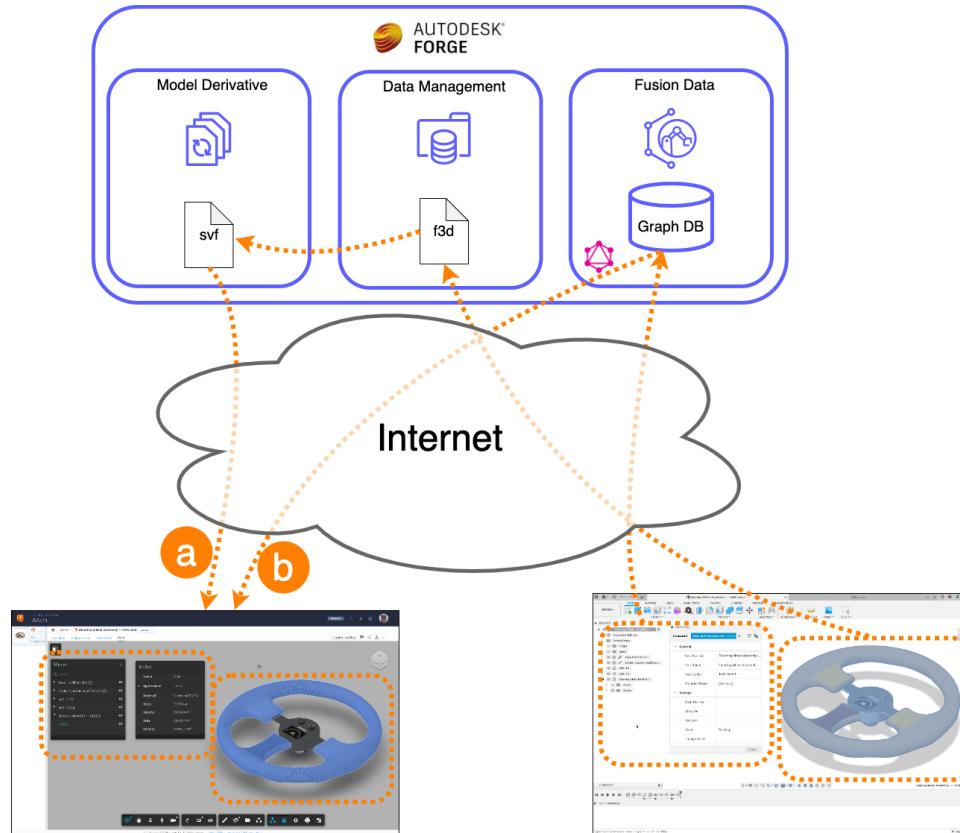
General	
Part Number	Steering Wheel Assembly ...
Part Name	Steering Wheel Assembl...
Description	New description
Material Name	(Various)

Manage	
Item Number	PN-000083
Lifecycle	Unreleased
Revision	
State	Working
Change Order	

At the bottom right of the dialog is a "Close" button.

# Fusion Data API

## ワークフロー



# Fusion Data API

## ワークフロー

The screenshot shows the "FUSION 360 DATA API GRAPHQL DEMO" application interface. On the left, there is a sidebar titled "ADAM NAGY'S HUBS" displaying a hierarchical list of projects and components. On the right, the main area has tabs for "QUERY EDITOR", "DEMO APP", "VIEWER", "COMPONENT TABLE", and "QUERY HISTORY". The "QUERY EDITOR" tab is active, showing a GraphQL query and its results.

```
query Project($id: String!) {
  project($projectId: $id) {
    id
    name
    rootFolder {
      items {
        results {
          id
          name
          ...on Component {
            type
            title
            partDescription
          }
        }
      }
    }
  }
}
```

The results pane displays the data returned by the query, including a "Steering Wheel Assembly -- FoFD test" component with its ID, name, and part description.

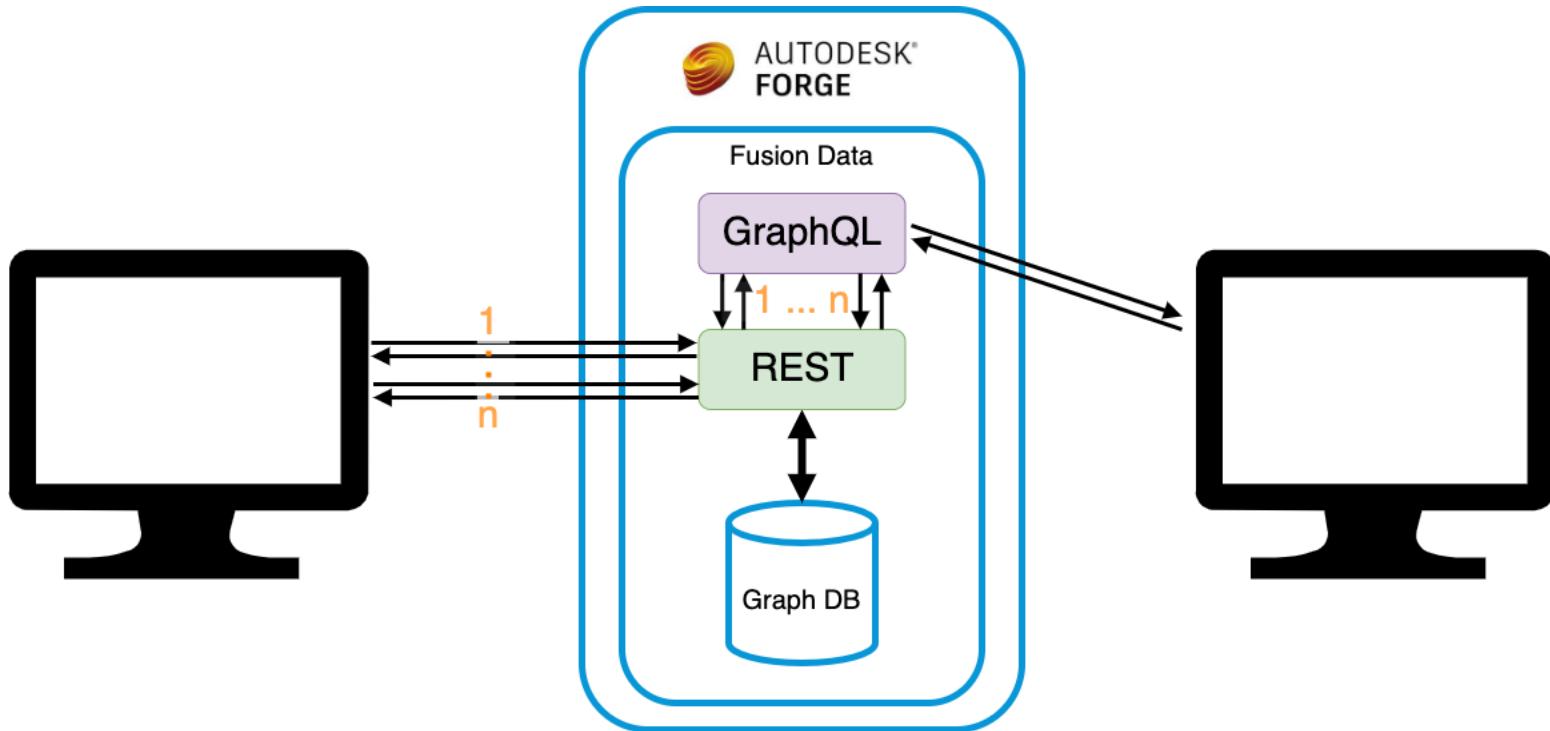
Component	ID	Name	Part Description
Steering Wheel Assembly -- FoFD test	1	Steering Wheel Assembly -- FoFD test	Steering Wheel Assembly -- FoFD test
Center-bracket-modified	2	Center-bracket-modified	Center-bracket-modified
Bolt-1	3	Bolt-1	Bolt-1
Bolt-2	4	Bolt-2	Bolt-2

At the bottom, the "QUERY VARIABLES" section contains the following variables:

```
variables: { id: "1", projectId: "1", title: "Steering Wheel Assembly -- FoFD test", partDescription: "Steering Wheel Assembly -- FoFD test" }
```

# Fusion Data API

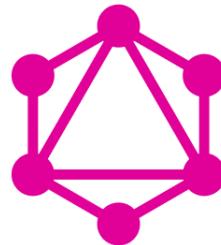
## GraphQL API



# Fusion Data API

REST vs GraphQL

- 少ないAPI呼び出し
- 複数のクエリーを、1回のAPIの呼び出しに集約
- 必要なデータのみを取得



GraphQL

# Fusion Data API

## GraphQL API

GraphQL interface showing a query for component versions and a 3D model of a steering wheel assembly.

```
query ComponentVersion($thisId: String!) {  
  componentVersion(componentVersionId: $thisId) {  
    name  
    modelOccurrences(pagination: {limit: 20, cursor: null}) {  
      results {  
        componentVersion {  
          name  
        }  
        modelOccurrences {  
          results {  
            componentVersion {  
              name  
            }  
          }  
        }  
      }  
      pagination {  
        limit  
        cursor  
      }  
    }  
  }  
}
```

QUERY VARIABLES

```
{  
  "hubId": "a.YnVzaW5lc3M6Ym9tbWVycGlt",  
  "projectId": "a.YnVzaW5lc3M6Ym9tbWVycGltIzIwMjEwNTExNDEzMzU5NDU2",  
  "thisId": "Y29tcH5jb4xMDY5RUZIZ1FreWVJaExVLWg0M0RBfIxTUmxZYk1JcIpW"}
```

The results of the GraphQL query are displayed in the browser:

```
{  
  "data": {  
    "componentVersion": {  
      "name": "Steering Wheel Assembly -- FoFD test",  
      "modelOccurrences": {  
        "results": [  
          {  
            "componentVersion": {  
              "name": "Base-modified"  
            },  
            "modelOccurrences": {  
              "results": [  
                {  
                  "componentVersion": {  
                    "name": "steering base"  
                  }  
                },  
                {  
                  "componentVersion": {  
                    "name": "PCB v1"  
                  }  
                },  
                {  
                  "componentVersion": {  
                    "name": "horn battery"  
                  }  
                }  
              ]  
            }  
          },  
          {  
            "componentVersion": {  
              "name": "Center-bracket-modified"  
            },  
            "modelOccurrences": {  
              "results": [  
                {  
                  "componentVersion": {  
                    "name": "Center bracket"  
                  }  
                }  
              ]  
            }  
          }  
        ]  
      }  
    }  
  }  
}
```

The browser also shows the document structure and a 3D model of the steering wheel assembly.



BROWSER

- Steering Wheel Assembly ...
  - Document Settings
  - Named Views
  - Origin
  - Joints
  - Base-modified v1:1
    - Origin
    - Joints
    - Sketches
    - Assembly Contexts
    - PCB v1:1
    - horn battery:1
    - steering base:1
  - Center-bracket-modified v1:1
    - Origin
    - Joints
    - Sketches
    - Assembly Contexts
    - LCD screen:1
    - Center bracket:1
    - Horn button:1
    - bolt-1:1
    - bolt-2:1
    - Steering wheel form v1:1

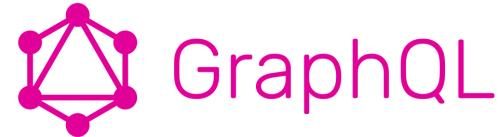
# Fusion Data API

REST vs GraphQL - 少ないAPI呼び出し



1 x /project/v1/hubs

n x /project/v1/hubs/:hub\_id/projects



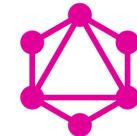
```
{  
  hubs {  
    results {  
      id  
      name  
      projects {  
        results {  
          name  
        }  
      }  
    }  
  }  
}
```

# Fusion Data API

REST vs GraphQL -複数のクエリーを、1回のAPIの呼び出しに集約



n x /project/v1/hubs/:hub\_id/projects

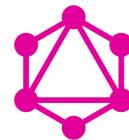


GraphQL

```
query {
  _1: hubs (filter: {name: "Fusion Data"}) {
    results {
      projects {
        results {
          name
        }
      }
    }
  },
  _2: hubs (filter: {name: "My Hub"}) {
    results {
      projects {
        results {
          name
        }
      }
    }
  }
}
```

# Fusion Data API

REST vs GraphQL - 必要なデータのみを取得



GraphQL

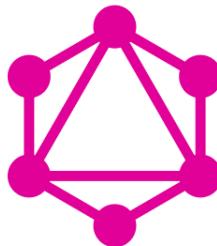
```
{  
  "type": "hubs",  
  "id": "a.cGVyc29uYWw6dWUy0WM4YjZi",  
  "attributes": {  
    "name": "Adam Nagy" // Boxed by yellow arrow  
  },  
  "extension": {  
    "type": "hubs:autodesk.a360:PersonalHub",  
    "version": "1.0",  
    "schema": {  
      "href": "https://developer.api.autodesk.com/schema/v1/versions/hubs:autodesk.a360:PersonalHub-1.0"  
    },  
    "data": {}  
  },  
  "region": "US"  
},  
  "links": {  
    "self": {  
      "href": "https://developer.api.autodesk.com/project/v1/hubs/a.cGVyc29uYWw6dWUy0WM4YjZi"  
    }  
},  
  "relationships": {  
    "projects": {  
      "links": {  
        "related": {  
          "href": "https://developer.api.autodesk.com/project/v1/hubs/a.cGVyc29uYWw6dWUy0WM4YjZi/projects"  
        }  
      }  
    }  
  }  
},  
}
```



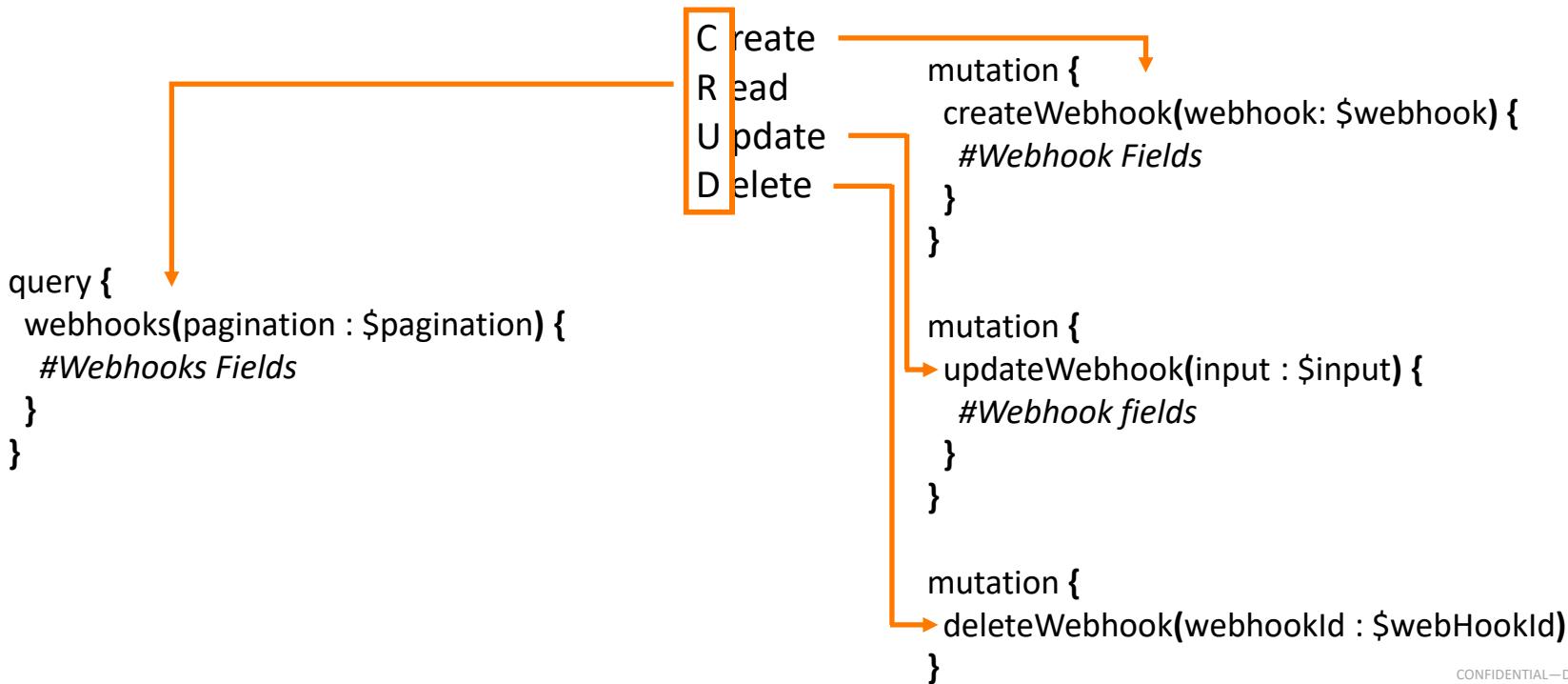
```
{  
  "data": {  
    "hubs": {  
      "results": [  
        {  
          "name": "Adam Nagy" // Boxed by yellow arrow  
        },  
        {  
          "name": "WW AC Repository"  
        },  
        {  
          "name": "Test Hub"  
        }  
      ]  
    }  
  }  
}  
// etc
```

# Fusion Data API

CRUD



# GraphQL



# Fusion Data API

## ドキュメント

[https://forge.autodesk.com/en/docs/fusiondata/v1/developers\\_guide/](https://forge.autodesk.com/en/docs/fusiondata/v1/developers_guide/)

<https://graphql.org/>



# Fusion Data API

## サンプル

[https://github.com/Autodesk-Forge/FusionData\\_Workflows](https://github.com/Autodesk-Forge/FusionData_Workflows)

The screenshot shows the GitHub repository page for 'Fusion Data Workflows'. The page has a dark theme. On the left, the README.md file is displayed, containing information about the repository. The right side of the page shows various repository statistics.

**Packages**  
No packages published  
Publish your first package

**Contributors** 2

- adamenagy Adam E Nagy
- towhidf

**Languages**

JavaScript 94.3%   HTML 5.7%

**README.md**

## Fusion Data Workflows

platform windows | osx | linux license mit

Forge API: OAuth2 v2 Fusion Data v1 Forge Data Events v1

---

This repository contains several samples illustrating use of Fusion Data API in context of various workflows:

1. Read the Complete Model Hierarchy of a Design
  - based on the path to a model (hub name, project name and file name) you can get the full model hierarchy - similar to what is shown inside Fusion 360.
2. Know when a Milestone is Available
  - subscribe to the `milestone.created` event of a specific model in order to be notified when a milestone is created for a given version of it.
3. Find the Thumbnail of a specific Part
  - based on the path to a model (hub name, project name and file name) you

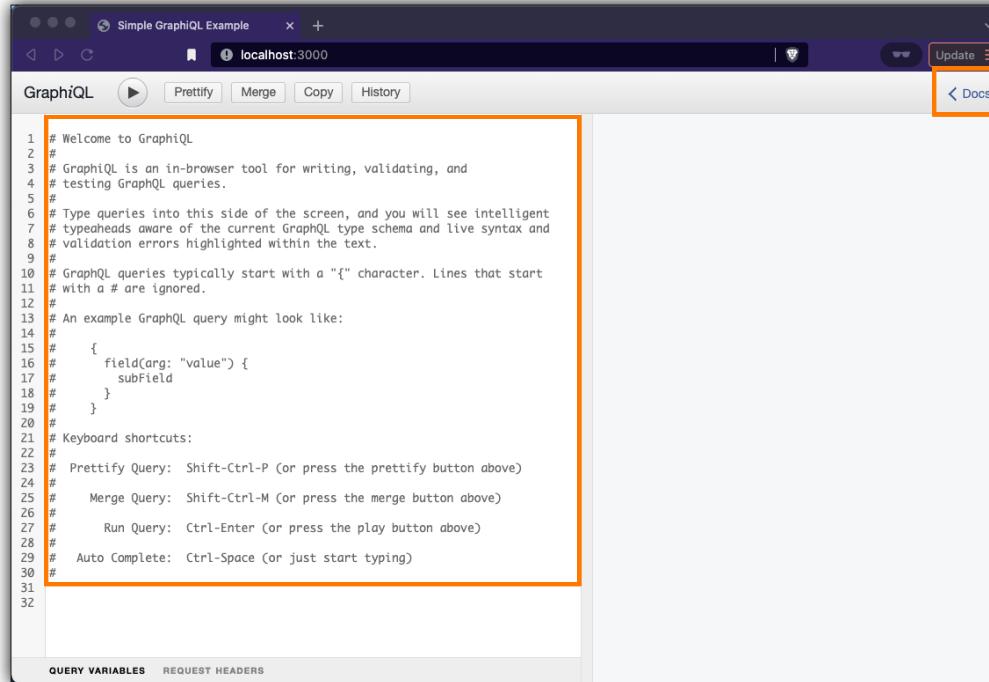
# Fusion Data API

サンプル – サムネイル画像の取得

# Fusion Data API

## サンプル - Fusion Data Explorer

[https://github.com/Autodesk-Forge/FusionData\\_Workflows/tree/main/Fusion%20Data%20Explorer](https://github.com/Autodesk-Forge/FusionData_Workflows/tree/main/Fusion%20Data%20Explorer)



The screenshot shows a browser window titled "Simple GraphQL Example" at "localhost:3000". The main content area contains a code editor with the following text:

```
1 # Welcome to GraphQL
2 #
3 # GraphQL is an in-browser tool for writing, validating, and
4 # testing GraphQL queries.
5 #
6 # Type queries into this side of the screen, and you will see intelligent
7 # typeheads aware of the current GraphQL type schema and live syntax and
8 # validation errors highlighted within the text.
9 #
10 # GraphQL queries typically start with a "{" character. Lines that start
11 # with a # are ignored.
12 #
13 # An example GraphQL query might look like:
14 #
15 #   {
16 #     field(arg: "value") {
17 #       subField
18 #     }
19 #   }
20 #
21 # Keyboard shortcuts:
22 #
23 # Prettify Query: Shift-Ctrl-P (or press the prettify button above)
24 #
25 # Merge Query: Shift-Ctrl-M (or press the merge button above)
26 #
27 # Run Query: Ctrl-Enter (or press the play button above)
28 #
29 # Auto Complete: Ctrl-Space (or just start typing)
30 #
31
32
```

A red box highlights the first 32 lines of the code. In the top right corner of the browser window, there is a "Docs" button, which is also highlighted with a red box.

# Fusion Data API

## ユーティリティ

<https://pim-graph-client.herokuapp.com/>

# Fusion Data API

## Utilities

# Fusion Data API

## イベント

MILESTONE\_CREATED

```
mutation {
  createWebhook(webhook: {
    componentId: $componentId,
    eventType: 'MILESTONE_CREATED',
    callbackURL: $callbackURL,
    expiresOn: "2022-10-12T07:20:50.52Z",
    secretToken: "12345678901234567890123456789012"
  }) {
    id
  }
}
```

