



bsDD GraphQL API – Sample Usecase

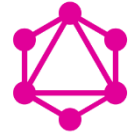
04th March 2021

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Outline

- GraphQL
 - What?
 - Why?
 - How?
- bsDD GraphQL
 - Queries
 - Demo
- Sample Usecase

GraphQL: What?



GraphQL

Query Language for APIs

Specification → runtime for fulfilling queries with existing data

- <https://graphql.org>

- Resources defined by a GraphQL Schema
- Client sends query, server orchestrates data
- Efficient
- Self Documenting (Introspection feature)

GraphQL – What does it do?

Queries – read data

```
query {  
  post(id: 1) {  
    id  
    title  
  }  
}
```

Mutation – write data

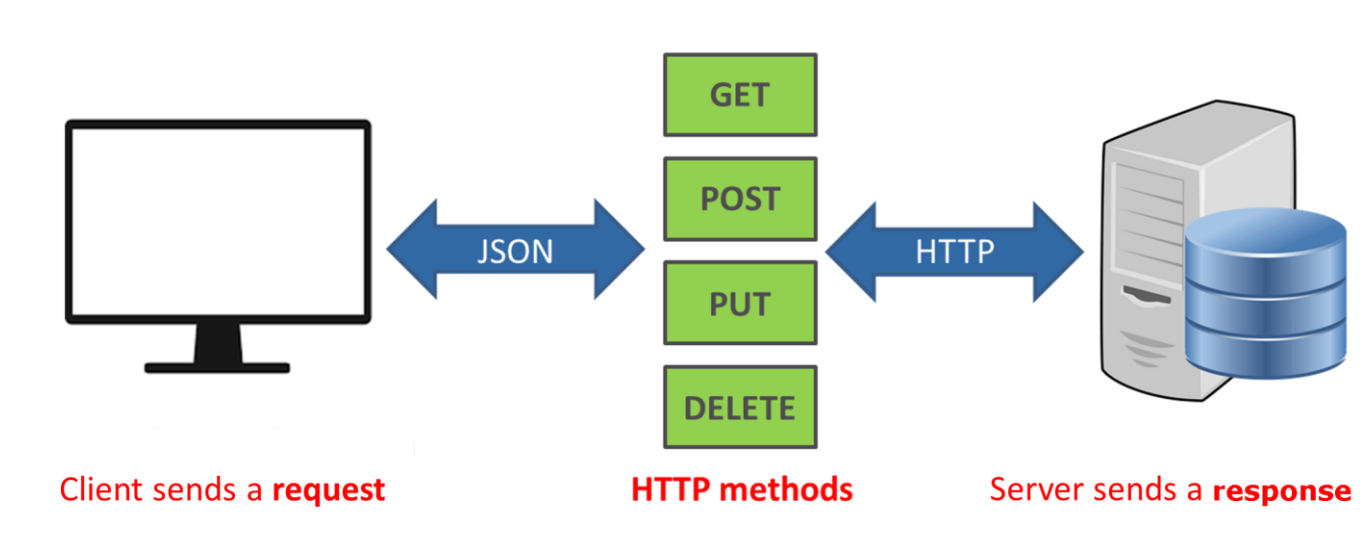
```
mutation {  
  createPost(title: "Intro to GraphQL") {  
    id  
    title  
  }  
}
```

Subscriptions – pushed data in real-time

```
subscription {  
  onCreatePost {  
    id  
    title  
  }  
}
```

GraphQL: Why use it?

{ REST }



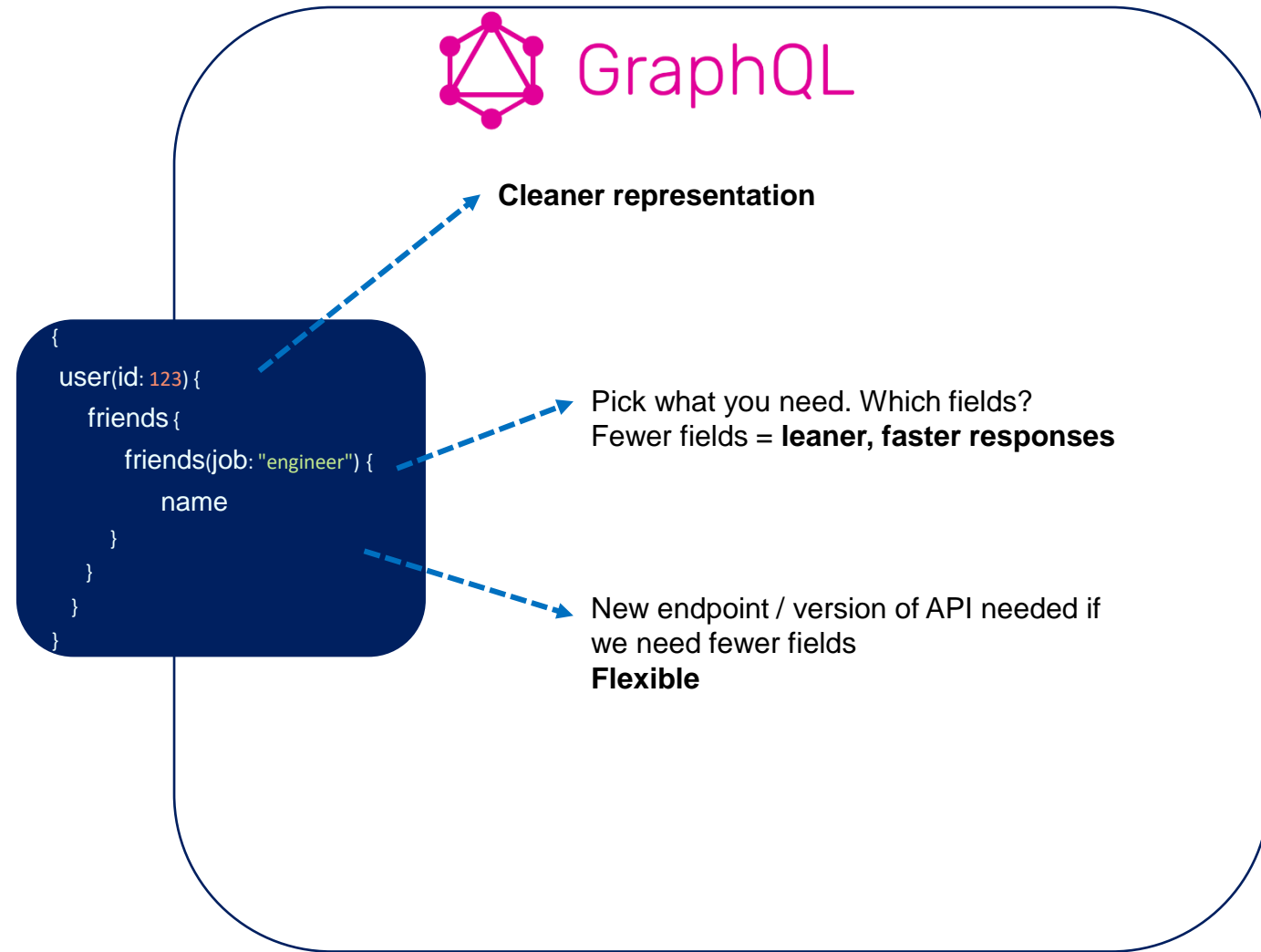
GraphQL: Why use it?

{ REST }

GET api.example.com/users/123?include=friend.friend.name&friend.friend.occupation=engineer

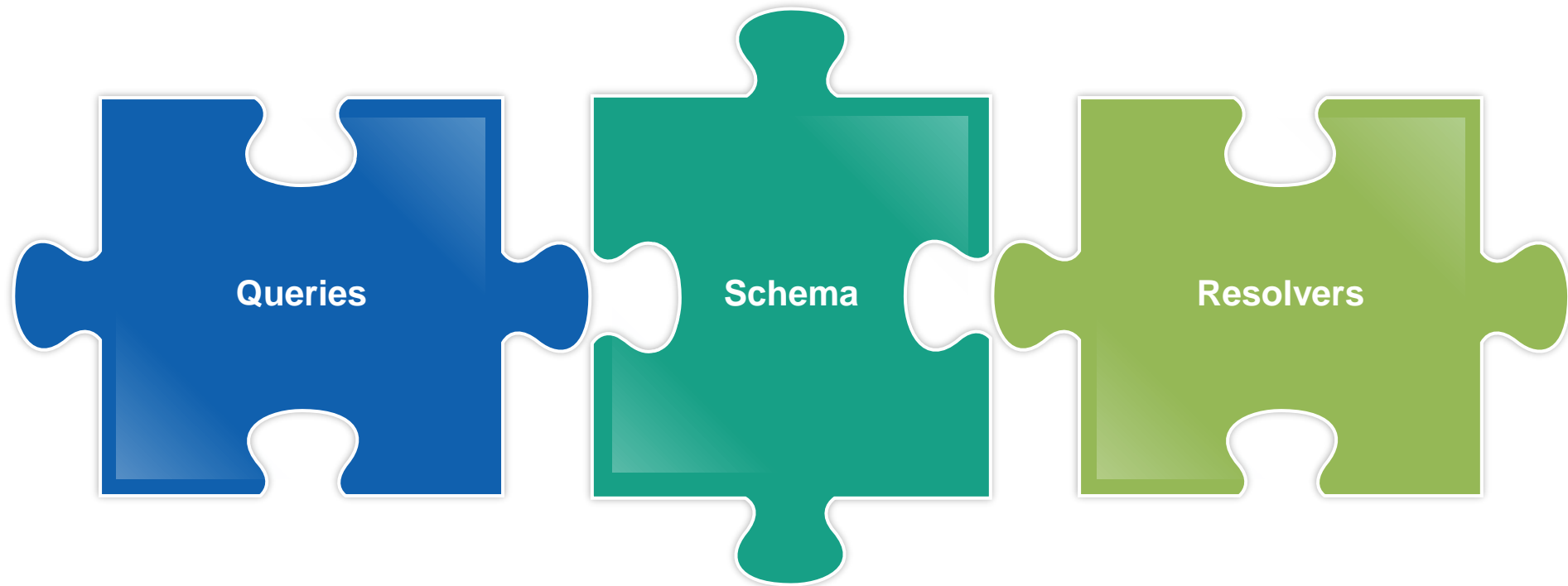
Cannot limit fields while gathering information from endpoint
⇒ **Always get a complete dataset : OVERFETCHING**

One endpoint, does one task - **Simple**,
but X endpoints, for X tasks - **Complex**



GraphQL: How?

The Building blocks



GraphQL: How?



Clients send these to specify the data they need

Contains:

- query (fetch data),
- mutation (modify data)
- subscription (allows you to get instant information regarding relevant events)



Contract for client-server communication

Specifies:

- what queries clients are allowed to make,
- the types of data that can be fetched
- relationships between types

Defined using GraphQL's Schema Definition Language (SDL).



Every field has a resolver function:

- specifies how that field is connected to the back end
- fetches data for that field from a database(s)/ microservice/ existing API

always know where to find something

Part 2: bsDD GraphQL

bsDD GraphQL

Operation type

Variable definitions

Operation name

```
query {  
  domain (namespaceUri : "http://identifier.buildingsmart.org/uri/etim/etim-8.0") {  
    classificationSearch(searchText: "dcf", languageCode: "EN") {  
      name  
      namespaceUri  
      synonyms  
      relatedIfcEntityNames  
      properties {  
        name  
        isRequired  
        pattern  
      }  
    }  
  }  
}
```

Variable definitions: usually optional.
Used for finding specific resource

Selection set on query

```
query{  
  domain (namespaceUri : "http://identifier.buildingsmart.org/uri/etim/etim-8.0"){  
    classificationSearch(searchText: "dcf", languageCode: "EN") {  
      name  
      namespaceUri  
      synonyms  
      relatedIfcEntityNames  
      properties {  
        name  
        isRequired  
        pattern  
      }  
    }  
  }  
}
```

Selection set on post

Selection sets specify what fields to resolve
→ what data to return

bsDD GraphQL – Operations

Queries – read data

Mutation – write data

Subscriptions – pushed data in real-time


Sample Queries to try out

```
{
  domain(namespaceUri: "http://identifier.buildingsmart.org/uri/buildingsmart/ifc-4.3") {
    name
    classificationSearch(searchText: "IfcDoor") {
      name
      activationDateUtc
      classificationType
      definition
      properties {
        name
      }
    }
  }
}

{
  {
    domain(namespaceUri: "http://identifier.buildingsmart.org/uri/promaterial/universaltypes-1.0") {
      name
      namespaceUri
      classification (namespaceUri: "http://identifier.buildingsmart.org/uri/promaterial/universaltypes-1.0/class/UT03", includeChilds: true)
      {
        name
        namespaceUri
        relations{
          {
            relationType
          }
        }
        properties {
          name
          dataType
        }
        childs{
          name
        }
      }
    }
  }
}
```

Demo

<https://github.com/sbalot/bsDDGQLQueries/blob/main/queries.graphql>

 [sbalot](#) / [bsDDGQLQueries](#)

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main

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Go to file




...

 **sbalot** initial commit via local file upload

Latest commit 3cf1e3d now [History](#)

1 contributor

72 lines (68 sloc) 1.44 KB

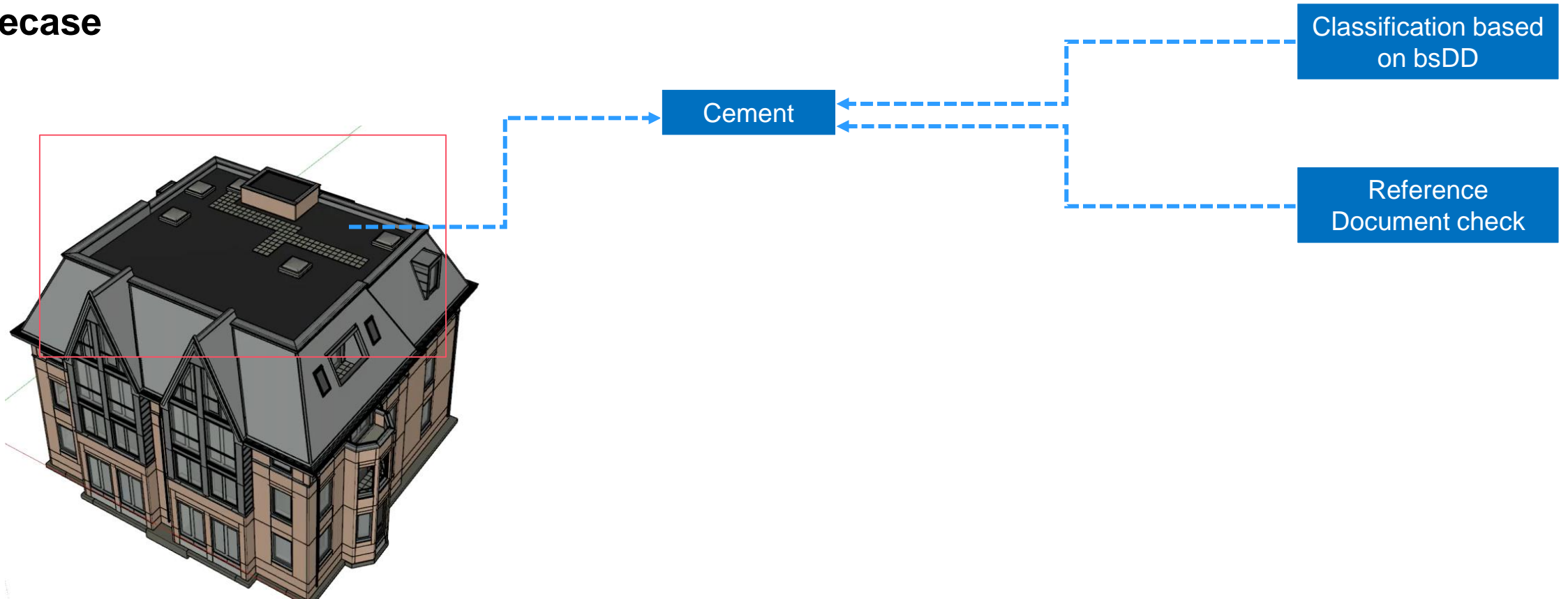
[Raw](#) [Blame](#)   

```
1 #Get all the Classifications in each domain
2 {
3   domains {
4     name
5     namespaceUri
6     classificationSearch(searchText: "") {
7       name
8       namespaceUri
9     }
10  }
11 }
```

Part 3: bsDD GraphQL Sample Usecase

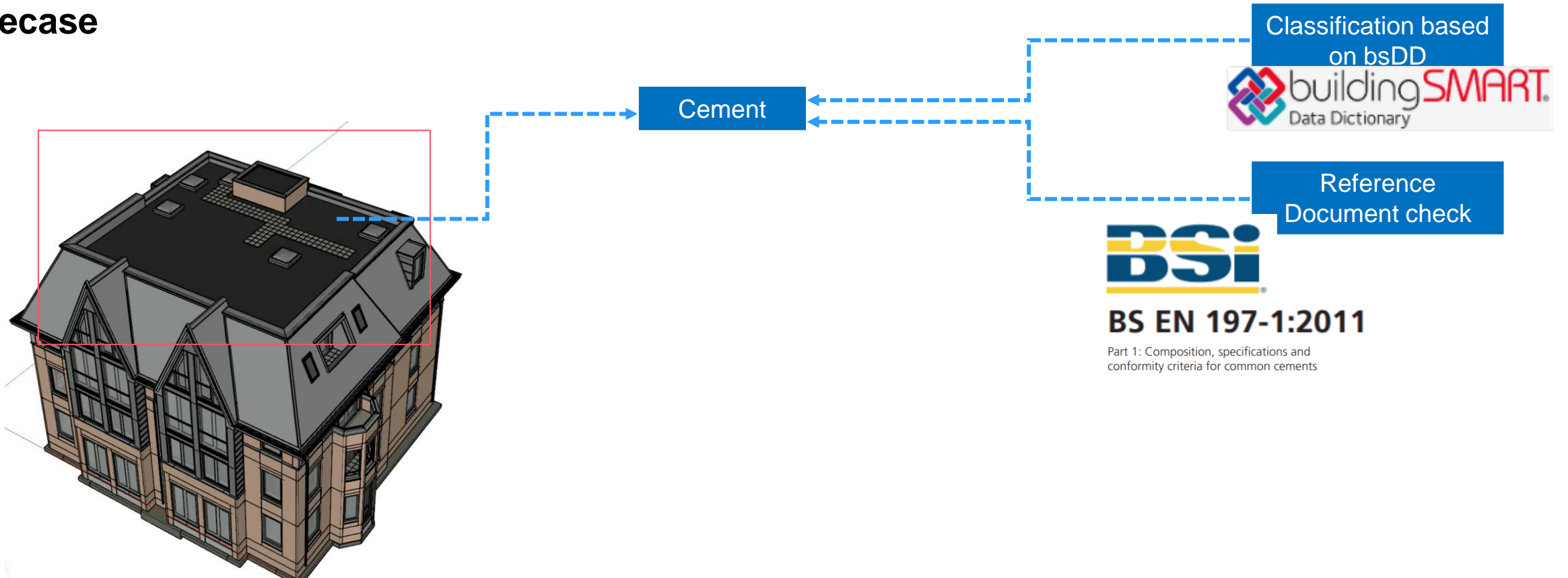
Compliance checks w.r.t Standards

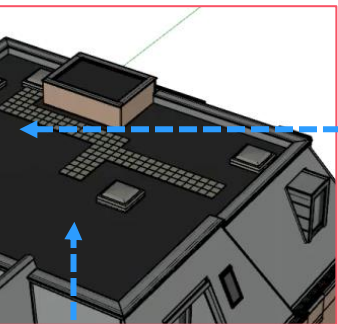
Usecase



Compliance checks w.r.t Standards

Usecase





Cement



ETIM
International



BS EN 197-1:2011

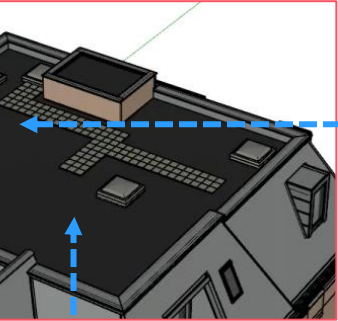
Part 1: Composition, specifications and conformity criteria for common cements

Table 3 — Mechanical and physical requirements given as characteristic values

Strength class	Compressive strength MPa				Initial setting time	Soundness (expansion)
	Early strength		Standard strength			
	2 days	7 days	28 days		min	mm
32,5 L ^a	-	≥ 12,0	≥ 32,5	≤ 52,5	≥ 75	≤ 10
	-	≥ 16,0				
	≥ 10,0	-				
32,5 N	≥ 10,0	-	≥ 42,5	≤ 62,5	≥ 60	
32,5 R	≥ 20,0	-				
52,5 L ^a	≥ 10,0	-				
52,5 N	≥ 20,0	-	≥ 52,5	-	≥ 45	
52,5 R	≥ 30,0	-				

^a Strength class only defined for CEM III cements.

File	Home	Insert	Page Layout	Formulas	Data	Review	View	Team	Tell me what you want to do...	
A104202 : EC003239										
Class ID	Class ver	Class	Sort Fc	Feature ID	Feature ID	Type	Feature	Sort Value	Value ID	Value
104198	EC003238	3 Foundation formwork	8	EF000010		A	Model	2	EV009659	Bottom plate
104199	EC003238	3 Foundation formwork	8	EF000010		A	Model	3	EV013150	Sidewall
104200	EC003238	3 Foundation formwork	8	EF000010		A	Model	4	EV013151	Corner element
104201	EC003238	3 Foundation formwork	8	EF000010		A	Model	5	EV000154	Other
104202	EC003239	3 Cement	1	EF007123		A	Scope of application	1	EV004226	Outside
104203	EC003239	3 Cement	1	EF007123		A	Scope of application	2	EV000937	Inside
104204	EC003239	3 Cement	1	EF007123		A	Scope of application	3	EV001971	Inside/outside
104205	EC003239	3 Cement	2	EF010438		A	Type of cement	1	EV012940	CEM I
104206	EC003239	3 Cement	2	EF010438		A	Type of cement	2	EV013152	CEM II
104207	EC003239	3 Cement	2	EF010438		A	Type of cement	3	EV013153	CEM III/A
104208	EC003239	3 Cement	2	EF010438		A	Type of cement	4	EV013155	CEM III/B
104209	EC003239	3 Cement	2	EF010438		A	Type of cement	5	EV013154	CEM III/C
104210	EC003239	3 Cement	2	EF010438		A	Type of cement	6	EV012945	CEM IV
104211	EC003239	3 Cement	2	EF010438		A	Type of cement	7	EV012946	CEM V
104212	EC003239	3 Cement	2	EF010438		A	Type of cement	8	EV000154	Other
104213	EC003239	3 Cement	3	EF010097		A	Strength class	1	EV013157	32.5 N
104214	EC003239	3 Cement	3	EF010097		A	Strength class	2	EV013158	32.5 R
104215	EC003239	3 Cement	3	EF010097		A	Strength class	3	EV013159	42.5 N



Cement



ETIM
International



BS EN 197-1:2011

Part 1: Composition, specifications and conformity criteria for common cements

Table 3 — Mechanical and physical requirements given as characteristic values

Strength class	Compressive strength MPa			Initial setting time	Soundness (expansion)	
	Early strength		Standard strength			
	2 days	7 days	28 days			
32,5 L ^a	-	≥ 12,0	≥ 32,5	≤ 52,5	≥ 75	≤ 10
	-	≥ 16,0				
	≥ 10,0	-				
42,5 N	≥ 10,0	-	≥ 42,5	≤ 62,5	≥ 60	
42,5 R	≥ 20,0	-				
52,5 L ^a	≥ 10,0	-				
52,5 N	≥ 20,0	-	≥ 52,5	-	≥ 45	
52,5 R	≥ 30,0	-				

^a Strength class only defined for CEM III cements.

```
"DocumentReference": {  
  "Name": "EN 197-1:2011",  
  "Requirements": {  
    "Name": "Soundness/Expansion"  
  },  
  "maxValue": "10"  
}
```

File	Home	Insert	Page Layout	Formulas	Data	Review	View	Team	Tell me what you want to do...		
A104202 : EC003239											
	Class ID	Class ver	Class	Sort F	Feature ID	Feature ID	Type	Feature	Sort Value	Value ID	Value
104198	EC003238		3 Foundation formwork	8	EF000010		A	Model	2	EV009659	Bottom plate
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104200	EC003238		3 Foundation formwork	8	EF000010		A	Model	4	EV013151	Corner element
104201	EC003238		3 Foundation formwork	8	EF000010		A	Model	5	EV000154	Other
104202	EC003239		3 Cement	1	EF007123		A	Scope of application	1	EV004226	Outside
104203	EC003239		3 Cement	1	EF007123		A	Scope of application	2	EV000937	Inside
104204	EC003239		3 Cement	1	EF007123		A	Scope of application	3	EV001971	Inside/outside
104205	EC003239		3 Cement	2	EF010438		A	Type of cement	1	EV012940	CEM I
104206	EC003239		3 Cement	2	EF010438		A	Type of cement	2	EV013152	CEM II
104207	EC003239		3 Cement	2	EF010438		A	Type of cement	3	EV013153	CEM III/A
104208	EC003239		3 Cement	2	EF010438		A	Type of cement	4	EV013155	CEM III/B
104209	EC003239		3 Cement	2	EF010438		A	Type of cement	5	EV013154	CEM III/C
104210	EC003239		3 Cement	2	EF010438		A	Type of cement	6	EV012945	CEM IV
104211	EC003239		3 Cement	2	EF010438		A	Type of cement	7	EV012946	CEM V
104212	EC003239		3 Cement	2	EF010438		A	Type of cement	8	EV000154	Other
104213	EC003239		3 Cement	3	EF010097		A	Strength class	1	EV013157	32.5 N
104214	EC003239		3 Cement	3	EF010097		A	Strength class	2	EV013158	32.5 R
104215	EC003239		3 Cement	3	EF010097		A	Strength class	3	EV013159	42.5 N

Under the hood: bsDD Schema



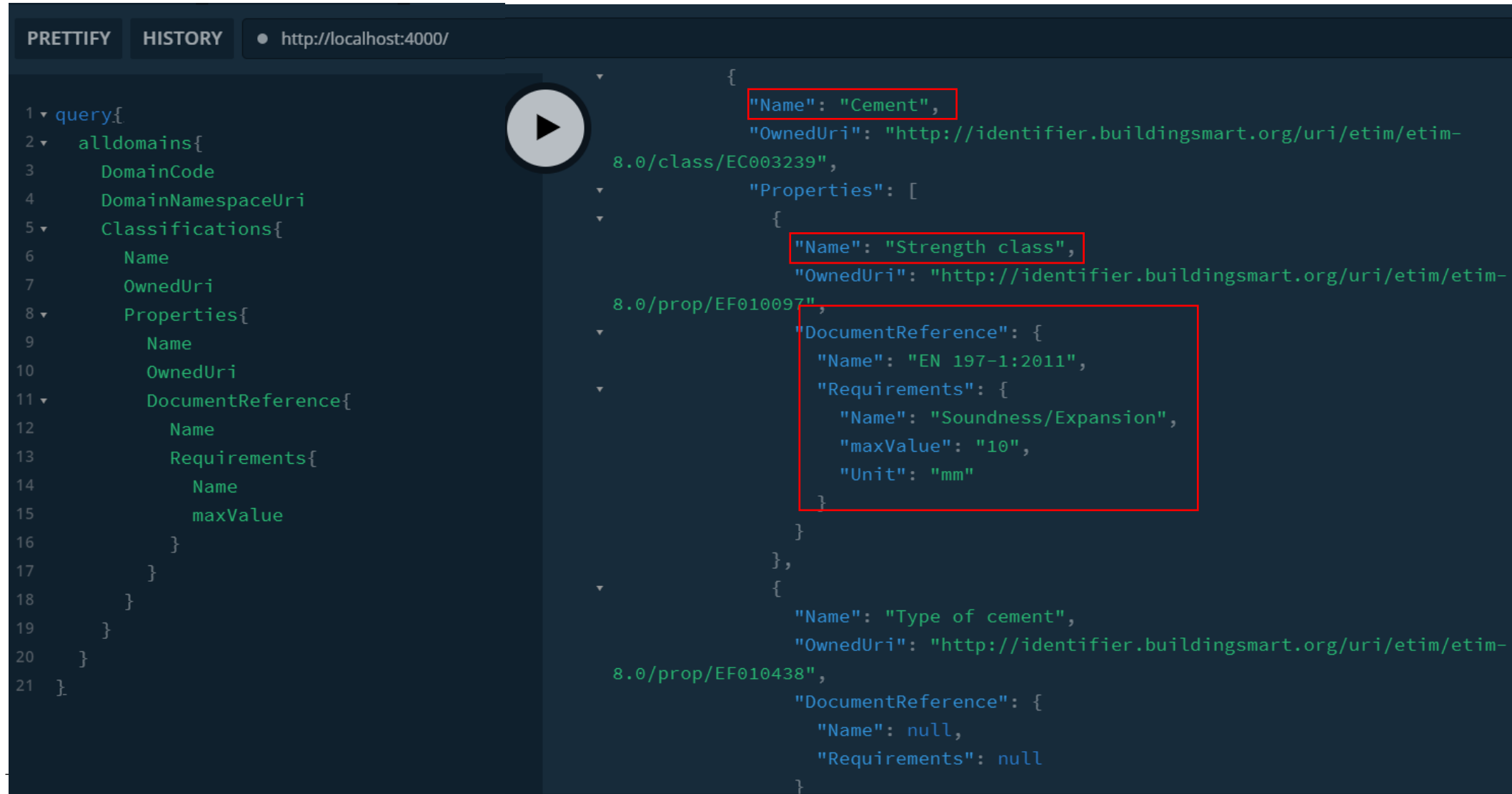
```
▼ array [1]
  ▼ 0 {16}
    OrganizationCode : ETIM
    DomainCode : ETIM
    DomainVersion : 8.0
    DomainName : {value}
    ReleaseDate : null
    Status : {value}
    MoreInfoUrl : {value}
    UseOwnUri : false
    DomainNamespaceUri : http://identifier.buildingsmart.org/uri/etim/etim-8.0
    LanguageIsoCode : EN
    LanguageOnly : false
    License : {value}
    LicenseUrl : {value}
    QualityAssuranceProcedure : {value}
    QualityAssuranceProcedureUrl : {value}
    ► Classifications [2]
```

```
Classifications [2]
  ► 0 {28}
  ▼ 1 {28}
    Code : {value}
    OwnedUri : http://identifier.buildingsmart.org/uri/etim/etim-8.0/class/EC003239
    Uid : {value}
    Name : Cement
    Definition : {value}
    Status : Active
    ActivationDateUtc : 2020-12-09T00:00:00+01:00
    RevisionDateUtc : null
    VersionDateUtc : 2020-12-09T00:00:00+01:00
    DeActivationDateUtc : null
    VersionNumber : null
    RevisionNumber : null
    ► ReplacedObjectCodes [0]
    ► ReplacingObjectCodes [0]
    DeprecationExplanation : {value}
    CreatorLanguageIsoCode : {value}
    VisualRepresentationUri : {value}
    ► CountriesOfUse [0]
    ► SubdivisionsOfUse [0]
    CountryOfOrigin : {value}
    DocumentReference : BS EN 197-1
    ClassificationType : Class
    ParentClassificationCode : E6020650
    ► RelatedIfcEntityNamesList [0]
    ► Synonyms [0]
    ► ClassificationRelations [1]
    ► ClassificationProperties [1]
    ► Properties [2]
```

```
▼ Properties [2]
  ▼ 0 {45}
    Code : {value}
    OwnedUri : http://identifier.buildingsmart.org/uri/etim/etim-8.0/prop/EF010097
    Uid : {value}
    Name : Strength class
    Definition : {value}
    Status : Active
    ActivationDateUtc : 2020-12-09T00:00:00+01:00
    RevisionDateUtc : null
    VersionDateUtc : 2020-12-09T00:00:00+01:00
    DeActivationDateUtc : null
    VersionNumber : null
    RevisionNumber : null
    ► ReplacedObjectCodes [0]
    ► ReplacingObjectCodes [0]
    DeprecationExplanation : {value}
    CreatorLanguageIsoCode : {value}
    VisualRepresentationUri : {value}
    ► CountriesOfUse [0]
    ► SubdivisionsOfUse [0]
    CountryOfOrigin : {value}
    DocumentReference {2}
    Description : {value}
    Example : {value}
    ► ConnectedPropertyCodes [0]
```

```
▼ DocumentReference {2}
  Name : EN 197-1:2011
  ▼ Requirements {2}
    Name : Soundness/Expansion
    maxValue : 10
```

Under the hood: querying bsDD-GraphQL API using GraphQL playground



The screenshot shows the GraphQL Playground interface. On the left, a query is written in a dark-themed editor. On the right, the JSON response is displayed. A play button is visible between the query and response panels. The response is a JSON object with a 'query' field containing an array of objects. The first object in the array is highlighted with a red box. The second object in the array is also highlighted with a red box. The third object in the array is highlighted with a red box. The fourth object in the array is highlighted with a red box.

```
1 query{
2   alldomains{
3     DomainCode
4     DomainNamespaceUri
5     Classifications{
6       Name
7       OwnedUri
8       Properties{
9         Name
10        OwnedUri
11        DocumentReference{
12          Name
13          Requirements{
14            Name
15            maxValu
16          }
17        }
18      }
19    }
20  }
21 }
```

```
{
  "Name": "Cement",
  "OwnedUri": "http://identifier.buildingsmart.org/uri/etim/etim-8.0/class/EC003239",
  "Properties": [
    {
      "Name": "Strength class",
      "OwnedUri": "http://identifier.buildingsmart.org/uri/etim/etim-8.0/prop/EF010097",
      "DocumentReference": {
        "Name": "EN 197-1:2011",
        "Requirements": {
          "Name": "Soundness/Expansion",
          "maxValue": "10",
          "Unit": "mm"
        }
      }
    },
    {
      "Name": "Type of cement",
      "OwnedUri": "http://identifier.buildingsmart.org/uri/etim/etim-8.0/prop/EF010438",
      "DocumentReference": {
        "Name": null,
        "Requirements": null
      }
    }
  ]
}
```




Thank you!

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Wrapping a Client
