



# CKC UserWebSocket



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## 1. Overview

Device Engine supports the subscription to the User Web Socket where user can get notification for CRUD operation on models over which the users have access.

### Websocket URL

```
wss://<server>/<tenant>/ deveng/ws/fid-CIMUserQueryInterfaceWS.<userId>
```

Key points to be noted here:

1. <Server> here refers to the same server URL that is applicable for all the CKC NB APIs.
2. <tenant> refers to the tenant name. For example, this will be of the form paris.com, devnet.com etc. This will be the same as the one received in the response of the /user/login CKC NB API.

### Subscription Message:

While connecting to the WebSocket the Request body needs to be in following format.

```
{
  "Query": {
    "Storage": "TqlSubscription",
    "Save": {
      "TqlSubscription": {
        "Label": "SensorSubscription",
        "sid": "22",
        "Notify.As": "::$event:Model:Attribute",
        "Notify.Format": "all",
        "Topic": "*:.*", "MessageType": "json:compact"
      }
    }
  }
}
```

This subscription message decides the content of the notification and the formatting.

Once the web socket subscription request is sent to Device Engine, it starts sending the Model Operation updates to the subscriber.

### Response

```
{
  "Query": {
    "Storage": "TqlSubscription",
    "Save": {
      "TqlSubscription": {
        "Label": "SensorSubscription",
        "sid": "22",
```

```
"Notify.As": "::$event:Model:Attribute",
"Notify.Format": "all",
"Topic": " *.*", "MessageType": "json:compact"
}
    }
}
}

{
  "Save":
  {
    "Status": "Success",
    "TqlSubscription":
    {
      "sid": "TS3513192448295672690#022",
      "Label":
      {
        "Status": "Success+Created:1:1520487496798;",
        "Value": "SensorSubscription"
      },
      "Topic":
      {
        "Status": "Success+Created:1:1520487496803;",
        "Value": " *.*"
      },
      "MessageType":
      {
        "Status": "Success+Created:1:1520487496803;",
        "Value": "json:compact"
      },
      "Notify":
      [
        {
          "As":
          {
            "Status": "Success+Created:1:1520487496804;",
            "Value": "::$event:Model:Attribute"
          }
        }
      ]
    }
  }
}
```

```
    },  
    {  
      "Format":  
      {  
        "Status":"Success+Created:1:1520487496804;",  
        "Value":"all"  
      }  
    }  
  ]  
}  
}  
}
```

## 2. Topic Filters

The value of the Topic attribute in the subscription message decides the models for whom the notification is sent to subscriber on any operation.

Following are the few variations of Topic formats.

### 2.1 Topic: \*.\*

This value of the topic subscribes for all model updates with no constrains.

Every operation will be notified to the client which has subscribed user Web Socket with Topic value as \*.\*

#### Subscription Message:

```
{
  "Query": {
    "Storage": "TqlSubscription",
    "Save": {
      "TqlSubscription": {
        "Label": "SensorSubscription",
        "sid": "22",
        "Notify.As": ";$event:Model:Attribute",
        "Notify.Format": "all",
        "Topic": "*.*", "MessageType": "json:compact"
      }
    }
  }
}
```

#### Notification Message:

```
{
  "TqlNotification": {
    "Create": {
      "Model": {
        "Attribute": [
          {
            "Value": "nickname",
            "Order": "0x00",
            "Version": 1,
            "Timestamp": 1520487924342,
            "Event": "Create",
            "sid": "DummyLight_SID-1",
            "QName": "CIM.Light.Data.Light.tag",
            "Model": "CIM.Light.Data.Light",
            "FName": "tag"
          },
          {
            "Value": "LightLabel",
            "Version": 1,
            "Timestamp": 1520487924342,
            "Event": "Create",

```

```

    "sid": "DummyLight_SID-1",
    "QName": "CIM.Light.Data.Light.label",
    "Model": "CIM.Light.Data.Light",
    "FName": "label"
  },
  {
    "Value": "poland.com",
    "Version": 1,
    "Timestamp": 1520487924342,
    "Event": "Create",
    "sid": "DummyLight_SID-1",
    "QName": "CIM.Light.Data.Light.tenantId",
    "Model": "CIM.Light.Data.Light",
    "FName": "tenantId"
  },
  {
    "Value": 1520487918537,
    "Version": 1,
    "Timestamp": 1520487924342,
    "Event": "Create",
    "sid": "DummyLight_SID-1",
    "QName": "CIM.Light.Data.Light.lastUpdated",
    "Model": "CIM.Light.Data.Light",
    "FName": "lastUpdated"
  },
  {
    "Value": 1520487918537,
    "Version": 1,
    "Timestamp": 1520487924342,
    "Event": "Create",
    "sid": "DummyLight_SID-1",
    "QName": "CIM.Light.Data.Light.createTime",
    "Model": "CIM.Light.Data.Light",
    "FName": "createTime"
  },
  {
    "Value": {
      "value1": "private1",
      "value2": "private2"
    },
    "Version": 1,
    "Timestamp": 1520487924342,
    "Event": "Create",
    "sid": "DummyLight_SID-1",
    "QName": "CIM.Light.Data.Light.private",
    "Model": "CIM.Light.Data.Light",
    "FName": "private"
  },
  {
    "Value": {
      "value1": "custom1",
      "value2": "custom2"
    },
    "Version": 1,
    "Timestamp": 1520487924342,
    "Event": "Create",

```



```
"sid": "DummyLight_SID-1",
"QName": "CIM.Light.Data.Light.custom",
"Model": "CIM.Light.Data.Light",
"FName": "custom"
},
{
  "Value": "LightthirdPartyId1",
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.thirdPartyId",
  "Model": "CIM.Light.Data.Light",
  "FName": "thirdPartyId"
},
{
  "Value": "Lightprovider",
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.providerDetails.provider",
  "Model": "CIM.Light.Data.Light",
  "FName": "providerDetails.provider"
},
{
  "Value": "LightOUI",
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.providerDetails.OUI",
  "Model": "CIM.Light.Data.Light",
  "FName": "providerDetails.OUI"
},
{
  "Value": true,
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.isIndependent",
  "Model": "CIM.Light.Data.Light",
  "FName": "isIndependent"
},
{
  "Value": false,
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.mobile",
  "Model": "CIM.Light.Data.Light",
  "FName": "mobile"
},
{
```

```
"Value": "tdr1xft8b86q",
"Version": 1,
"Timestamp": 1520487924343,
"Event": "Create",
"sid": "DummyLight_SID-1",
"QName": "CIM.Light.Data.Light.geohash",
"Model": "CIM.Light.Data.Light",
"FName": "geohash"
},
{
  "Value": 12.933786,
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.geocoordinates.latitude",
  "Model": "CIM.Light.Data.Light",
  "FName": "geocoordinates.latitude"
},
{
  "Value": 77.691904,
  "Version": 1,
  "Timestamp": 1520487924343,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.geocoordinates.longitude",
  "Model": "CIM.Light.Data.Light",
  "FName": "geocoordinates.longitude"
},
{
  "Value": 45.49,
  "Version": 1,
  "Timestamp": 1520487924344,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.geocoordinates.altitude",
  "Model": "CIM.Light.Data.Light",
  "FName": "geocoordinates.altitude"
},
{
  "Value": "wifi",
  "Version": 1,
  "Timestamp": 1520487924344,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.connectivityType",
  "Model": "CIM.Light.Data.Light",
  "FName": "connectivityType"
},
{
  "Value": true,
  "Version": 1,
  "Timestamp": 1520487924344,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.deviceState.connState.connected",
```

```
"Model": "CIM.Light.Data.Light",
"FName": "deviceState.connState.connected"
},
{
  "Value": 1520487918537,
  "Version": 1,
  "Timestamp": 1520487924344,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.deviceState.connState.since",
  "Model": "CIM.Light.Data.Light",
  "FName": "deviceState.connState.since"
},
{
  "Value": 33.0,
  "Version": 1,
  "Timestamp": 1520487924344,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.deviceState.batteryPercentage",
  "Model": "CIM.Light.Data.Light",
  "FName": "deviceState.batteryPercentage"
},
{
  "Value": "Halogen",
  "Version": 1,
  "Timestamp": 1520487924345,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.type",
  "Model": "CIM.Light.Data.Light",
  "FName": "type"
},
{
  "Value": "Halogen Light Model-11",
  "Version": 1,
  "Timestamp": 1520487924345,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.model",
  "Model": "CIM.Light.Data.Light",
  "FName": "model"
},
{
  "Value": "continuous-wave",
  "Order": "0x00",
  "Version": 1,
  "Timestamp": 1520487924345,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.mode",
  "Model": "CIM.Light.Data.Light",
  "FName": "mode"
},
{
  "Value": "Manual override",
```

```
"Order": "0x00",
"Version": 1,
"Timestamp": 1520487924345,
"Event": "Create",
"sid": "DummyLight_SID-1",
"QName": "CIM.Light.Data.Light.supportedMode",
"Model": "CIM.Light.Data.Light",
"FName": "supportedMode"
},
{
  "Value": "Light",
  "Order": "0x00",
  "Version": 1,
  "Timestamp": 1520487924345,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.applicableDomain",
  "Model": "CIM.Light.Data.Light",
  "FName": "applicableDomain"
},
{
  "Value": "Light",
  "Version": 1,
  "Timestamp": 1520487924345,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.parentDomain",
  "Model": "CIM.Light.Data.Light",
  "FName": "parentDomain"
},
{
  "Value": 0.1,
  "Version": 1,
  "Timestamp": 1520487924346,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.state.powerConsumption",
  "Model": "CIM.Light.Data.Light",
  "FName": "state.powerConsumption"
},
{
  "Value": 100.0,
  "Version": 1,
  "Timestamp": 1520487924346,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.state.reliability",
  "Model": "CIM.Light.Data.Light",
  "FName": "state.reliability"
},
{
  "Value": "In Progress",
  "Version": 1,
  "Timestamp": 1520487924346,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
```

```
"QName": "CIM.Light.Data.Light.state.intensityLevel.request.status",
"Model": "CIM.Light.Data.Light",
"FName": "state.intensityLevel.request.status"
},
{
  "Value": "REQ-01",
  "Version": 1,
  "Timestamp": 1520487924346,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.state.intensityLevel.request.id",
  "Model": "CIM.Light.Data.Light",
  "FName": "state.intensityLevel.request.id"
},
{
  "Value": "USER-11",
  "Version": 1,
  "Timestamp": 1520487924347,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.state.intensityLevel.request.userId",
  "Model": "CIM.Light.Data.Light",
  "FName": "state.intensityLevel.request.userId"
},
{
  "Value": 80.0,
  "Version": 1,
  "Timestamp": 1520487924347,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.state.intensityLevel.request.value",
  "Model": "CIM.Light.Data.Light",
  "FName": "state.intensityLevel.request.value"
},
{
  "Value": 100.0,
  "Version": 1,
  "Timestamp": 1520487924347,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.state.intensityLevel.lastKnownValue",
  "Model": "CIM.Light.Data.Light",
  "FName": "state.intensityLevel.lastKnownValue"
},
{
  "Value": "DummyLightZone_SID-1",
  "Version": 1,
  "Timestamp": 1520487924347,
  "Event": "Create",
  "sid": "DummyLight_SID-1",
  "QName": "CIM.Light.Data.Light.lightZoneId",
  "Model": "CIM.Light.Data.Light",
  "FName": "lightZoneId"
},
{
  "Value": "LightGrpCtrl-SID-1",
```

```

    "Version":1,
    "Timestamp":1520487924347,
    "Event":"Create",
    "sid":"DummyLight_SID-1",
    "QName":"CIM.Light.Data.Light.grpCtrl",
    "Model":"CIM.Light.Data.Light",
    "FName":"grpCtrl"
  },
  {
    "Value":"DummyPowermeter_SID-1",
    "Version":1,
    "Timestamp":1520487924347,
    "Event":"Create",
    "sid":"DummyLight_SID-1",
    "QName":"CIM.Light.Data.Light.powerMeter",
    "Model":"CIM.Light.Data.Light",
    "FName":"powerMeter"
  }
]
}
}
}
}

{
  "TqINotification":{
    "Update":{
      "Model":{
        "Attribute":{
          "Value":80.0000000000,
          "OldValue":100.0000000000,
          "Version":2,
          "Timestamp":1520487924825,
          "OldTimestamp":1520487924400,
          "Event":"Update",
          "sid":"DummyLight_SID-2",
          "QName":"CIM.Light.Data.Light.state.intensityLevel.request.value",
          "Model":"CIM.Light.Data.Light",
          "FName":"state.intensityLevel.request.value"
        }
      }
    }
  }
}

{
  "TqINotification":{
    "Create":{
      "Model":{
        "Attribute":[
          {
            "Value":"sensitymobility",
            "Version":1,
            "Timestamp":1520487810273,

```

```
    "Event": "Create",
    "sid": "SensityMobilityProvider",
    "QName": "CIM.Common.Data.Provider.label",
    "Model": "CIM.Common.Data.Provider",
    "FName": "label"
  },
  {
    "Value": "Dummy",
    "Version": 1,
    "Timestamp": 1520487810274,
    "Event": "Create",
    "sid": "SensityMobilityProvider",
    "QName": "CIM.Common.Data.Provider.providerInsName",
    "Model": "CIM.Common.Data.Provider",
    "FName": "providerInsName"
  }
]
}
```

First notification is for Light Model creation which contains all the information about all the attributes created and second notification is light update and the third one is for Provider Model Creation.

## 2.2 Topic: \*modelName.AttributeName.\*

This kind of filter restricts the notification to the provided model's notifications only for the operation on specified attribute.

### Subscription Message:

```
{
  "Query": {
    "Storage": "TqlSubscription",
    "Save": {
      "TqlSubscription": {
        "Label": "SensorSubscription",
        "sid": "22",
        "Notify.As": "$event:Model:Attribute",
        "Notify.Format": "all",
        "Topic": "**ParkingSpot.state.occupied.value*",
        "MessageType": "json:compact"
      }
    }
  }
}
```

### Notification Message:

```
{
  "TqlNotification": {
    "Update": {
      "Model": {
```

```

    "Attribute":{
      "Value":false,
      "OldValue":true,
      "Version":2,
      "Timestamp":1520489119027,
      "OldTimestamp":1520488984257,
      "Event":"Update",
      "sid":"DummyParkingSpot-001",
      "QName":"CIM.Parking.Data.ParkingSpot.state.occupied.value",
      "Model":"CIM.Parking.Data.ParkingSpot",
      "FName":"state.occupied.value"
    }
  }
}
}
{
  "TqINotification":{
    "Create":{
      "Model":{
        "Attribute":{
          "Value":true,
          "Version":1,
          "Timestamp":1520489294060,
          "Event":"Create",
          "sid":"DummyParkingSpot-00112",
          "QName":"CIM.Parking.Data.ParkingSpot.state.occupied.value",
          "Model":"CIM.Parking.Data.ParkingSpot",
          "FName":"state.occupied.value"
        }
      }
    }
  }
}
}
}

```

The first notification is for ParkingSpot.occupied update operation. And the second one have come on socket when the new ParkingSpot is created. As only occupied is mentioned in the topic only that attribute information is in the notification.

### Notification Grammar:

The structure of the notification message depends on the attribute 'Notify.As' in the subscription message that is sent to Device Engine WebSocket Server.

Notify.As Formats:

Below are the few variations of Notify.As attribute Values

#### a) Without Notify.As

Subscription Message:

```

{
  "Query":{
    "Storage":"TqISubscription",

```



```

"Save":{
  "TqSubscription":{
    "Label":"SensorSubscription",
    "sid":"22",
    "Notify.Format":"all",
    "Topic":"*.*",
    "MessageType":"json:compact"
  }
}
}
}

```

### Response:

```

{
  "TqNotification":{
    "Update":{
      "DummyParkingSpot-00112":{
        "CIM.Parking.Data.ParkingSpot.state.occupied.value":{
          "Value":false,
          "OldValue":true,
          "Version":22,
          "Timestamp":1520517879065,
          "OldTimestamp":1520517374061,
          "Event":"Update",
          "sid":"DummyParkingSpot-00112",
          "QName":"CIM.Parking.Data.ParkingSpot.state.occupied.value",
          "Model":"CIM.Parking.Data.ParkingSpot",
          "FName":"state.occupied.value"
        }
      }
    }
  }
}
}

```

### b) Notify.As “: \$event:Model:Attribute”

#### Subscription Message:

```

{
  "Query":{
    "Storage":"TqSubscription",
    "Save":{
      "TqSubscription":{
        "Label":"SensorSubscription",
        "sid":"22",
        "Notify.Format":"all",
        "Notify.As":":$event:Model:Attribute",
        "Topic":"*.*",
        "MessageType":"json:compact"
      }
    }
  }
}
}

```

**Response:**

```

{
  "TqINotification":{
    "Create":{
      "Model":{
        "Attribute":{
          "Value":true,
          "Version":1,
          "Timestamp":1520489294060,
          "Event":"Create",
          "sid":"DummyParkingSpot-00112",
          "QName":"CIM.Parking.Data.ParkingSpot.state.occupied.value",
          "Model":"CIM.Parking.Data.ParkingSpot",
          "FName":"state.occupied.value"
        }
      }
    }
  }
}

```

**c) Notify.As “: \$event:\$model:\$sid”****Subscription Message:**

```

{
  "Query":{
    "Storage":"TqISubscription",
    "Save":{
      "TqISubscription":{
        "Label":"SensorSubscription",
        "sid":"22",
        "Notify.Format":"all",
        "Notify.As":":$event:$model:$sid"
        "Topic":"*: *",
        "MessageType":"json:compact"
      }
    }
  }
}

```

**Response:**

```

{
  "TqINotification":{
    "Update":{
      "DummyParkingSpot-00112":{
        "CIM.Parking.Data.ParkingSpot.state.occupied.value":{
          "Value":false,
          "OldValue":true,
          "Version":24,
          "Timestamp":1520518779099,
          "OldTimestamp":1520518084069,
          "Event":"Update",
          "sid":"DummyParkingSpot-00112",
          "QName":"CIM.Parking.Data.ParkingSpot.state.occupied.value",
          "Model":"CIM.Parking.Data.ParkingSpot",
          "FName":"state.occupied.value"
        }
      }
    }
  }
}

```

```
}  
}  
}  
}  
}
```

### 3. Fields Description

The details description of the fields in the notification.

- **Create**  
It is the operation type of the model for which the notification has been sent.
- **Model**  
List of models for which the operation has been performed.
- **Attribute**  
List of attributes in the given model which has been modified by the operation specified.
- **Value**  
Value of the attribute.
- **OldValue**  
The old value in case of update event.
- **Version**  
Version of the attribute in the model.
- **Order**  
If the cardinality is more than one, then refers the index in the list.
- **QName**  
It is a qualified name of the attribute depicting the hierarchy of the model with respect to whole modelling structure.
- **Model**  
This is fully qualified model name with hierarchy.
- **FName**  
This the path from the model name to the leaf node where the actual value is stored in the tree like structure.