

FieldServer ENOTE  
**Virtual Points Configuration**



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## fieldserver

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# 1 Virtual Points

In this interface you will be able to define new points based on calculated values of existing points on your device profile. These new points are defined by means of a JSON configuration.

You will be able to create new points:

- By running calculations amongst multiple points following the JSON Logic standard ([jsonlogic.com](http://jsonlogic.com))
- By defining analytics functions such as 'delta\_time\_average' on existing points

Virtual points also allow the following functionality:

- Periodic and COV logging
- Event alarming (also trouble and warning)
  - Event conditions: GT, GTE, LT, LTE, EQ, NE
- Simple math
- If, if/and, nested if
- Averaging over delta time (months/weeks/days/hours/minutes/seconds)

## 1.1 Virtual Points Structure Examples

Each device profile can contain a list of virtual point definitions, which will be in the form of a JSON Array

Below is how an empty list of virtual points definitions would look like:

```
[]
```

Creating a new virtual point called 'newProperty1' by multiplying points 'property0' and 'property1' (JSON Logic)

```
{
  "jsonLogic": {
    "*": [
      {
        "var": "property0"
      },
      {
        "var": "property1"
      }
    ]
  },
  "outputPoint": {
    "name": "newProperty1",
    "display_label": "My New Property 1",
    "decimals": 2,
    "units": "Deg_C"
  }
}
```

Creating a new virtual point called 'scaledProperty1' by multiplying point 'property0' by 100 (JSON Logic)

```
{
  "jsonLogic": {
    "*": [
      {
        "var": "property0"
      },
      100
    ]
  },
  "outputPoint": {
    "name": "scaledProperty1",
    "display_label": "My Scaled Property 1"
  }
}
```

Creating a new virtual point called 'newDeltaTimeAverage1' for point 'property0' which will output a daily rate of change for 'property0' (Analytics)

```
{
  "analytics": {
    "delta_time_average": {
      "point": "property0",
      "schedule": {
        "value": 24,
        "unit": "hours"
      }
    }
  },
  "outputPoint": {
    "name": "newDeltaTimeAverage1",
    "display_label": "My Delta Time Average Point 1",
    "units": ""
  }
}
```

Creating a new virtual point called 'newDeltaTimeAverage2' for point 'property0' which will output the rate of change of 'property0' every 2 minutes (Analytics)

```
{
  "analytics": {
    "delta_time_average": {
      "point": "property0",
      "schedule": {
        "cronSchedule": "*/2 * * * *"
      }
    }
  },
  "outputPoint": {
    "name": "newDeltaTimeAverage1",
    "display_label": "My Delta Time Average Point 1",
    "units": ""
  }
}
```

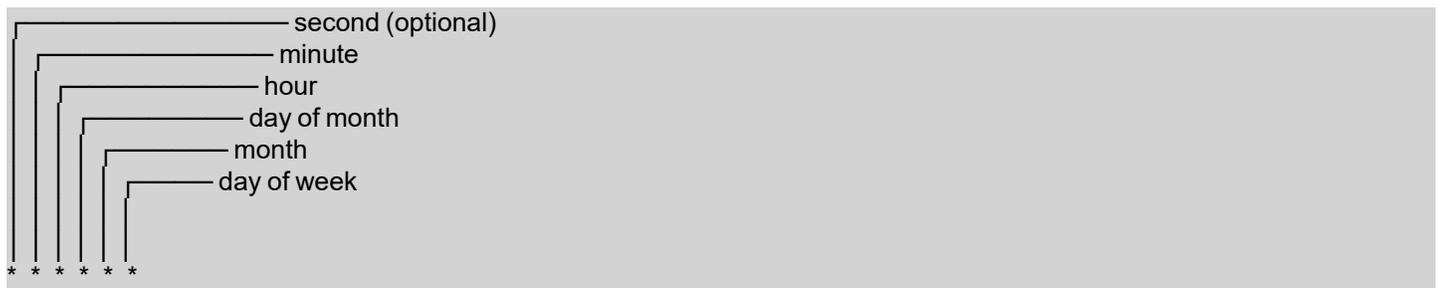
## 1.2 Time Expressions

### Available Delta Time Average Units

- seconds
- minutes
- hours
- day\_of\_month
- month
- day\_of\_week

### Creating Delta Time Average Tasks using the 'cronSchedule' parameter

#### Allowed fields



#### Allowed values

Field	Value
second	0-59
minute	0-59
hour	0-23
day of month	1-31
month	1-12
day of week	0-7

#### Typical Examples

Cron Schedule	Description
* * * * *	Running a task every minute
1,2,4,5 * * * * *	Running every minute 1, 2, 4 and 5
1-5 * * * * *	Running every minute to 1 from 5
*/2 * * * * *	Running every two minutes
* * * January,September Sunday	Running on Sundays of January and September
* * * Jan,Sep Sun	Running on Sundays of January and September
0 1 * * *	Running a job at 01:00 at the set up time zone

### 1.3 Configuring Logging And Event Settings

You are also able to assign pre-defined logging and event settings for each virtual point.

#### Periodic Logging Example

```
[{
  "analytics": {
    "delta_time_average": {
      "point": "property0",
      "schedule": {
        "value": "24",
        "unit": "hours"
      }
    }
  },
  "outputPoint": {
    "name": "newDeltaTimeAverage1",
    "display_label": "My Deta Time Average Point 1",
    "units": ""
    "log": {
      "type": "periodic",
      "periodic_interval": 10,
    }
  }
}]
```

#### Logging Based On Change of Value Example

```
[{
  "analytics": {
    "delta_time_average": {
      "point": "property0",
      "schedule": {
        "value": "24",
        "unit": "hours"
      }
    }
  },
  "outputPoint": {
    "name": "newDeltaTimeAverage1",
    "display_label": "My Deta Time Average Point 1",
    "units": ""
    "log": {
      "type": "cov",
      "threshold": 10,
      "cov_max_scan_time": 600
    }
  }
}]
```

## Assigning an Event Example

```
[{
  "analytics": {
    "delta_time_average": {
      "point": "property0",
      "schedule": {
        "value": "24",
        "unit": "hours"
      }
    }
  },
  "outputPoint": {
    "name": "newDeltaTimeAverage1",
    "display_label": "My Deta Time Average Point 1",
    "units": ""
    "event": {
      "type": "alarm",
      "alarm_setpoint": 10,
      "condition": "GTE"
    }
  }
}]
```

### Available Event Types

- trouble
- alarm
- warning

### Available Event Conditions

- GT (Greater than)
- GTE (Greater than or equal to)
- LT (Less than)
- LTE (Less than or equal to)
- EQ (Equal to)
- NE (Not Equal to)

### Example of a Complex List of Virtual Points Settings

```
[
  {
    "analytics": {
      "delta_time_average": {
        "point": "CYCLE_COUNT",
        "schedule": {
          "value": "24",
          "unit": "hours"
        }
      }
    },
    "outputPoint": {
      "name": "CYCLE_COUNT_PER_DAY",
      "display_label": "CYCLE_COUNT Per Day",
```

```

"units": "",
"log": {
  "type": "cov",
  "threshold": 0
},
"event": {
  "type": "alarm",
  "alarm_setpoint": 20,
  "condition": "GTE",
}
},
{
"jsonLogic": {
  "**": [
    {
      "/": [
        {
          "var": "STACKTEMPDEGF"
        },
        {
          "var": "FIRING_RATE"
        }
      ]
    }
  ],
  100
}
},
"outputPoint": {
"name": "STACKTEMPDEGF_vs_FIRING_RATE",
"display_label": "STACKTEMPDEGF vs FIRING_RATE",
"decimals": 2,
"units": "",
"log": {
  "type": "cov",
  "threshold": 0
},
"event": {
  "type": "trouble",
  "alarm_setpoint": 5,
  "condition": "LTE",
}
}
},
]

```