

IBM® Water Operations for Waternamics User Guide

Note: Before using this information and the product it supports, read the information in the [Notices](#) section at the end of the document.

This edition applies to version 5, release 1, modification 0 of IBM® Water Operations for Waternamics and to all subsequent releases and modifications until otherwise indicated in new editions.

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1. Introduction

This guide is an introduction to the capabilities of IBM® Water Operations for Waternamics, and describes some of the use cases implemented by the solution.

For more information about using the solution, see the [IBM® Intelligent Operations Center product documentation](#).

2. Solution overview

IBM® Water Operations for Waternamics is a solution that is built upon and enhances the IBM® Intelligent Operations Center software.

IBM® Water Operations for Waternamics is designed as a situation-based solution that facilitates the effective operational control of the water network of a city or water district.

The solution delivers the following benefits:

- Gathers and correlates data from sensors and enterprise systems. This includes data on assets, measurement readings, and events.
- Presents this data in a geospatial context to different user profiles, thus providing users with the relevant information to enable them to make informed decisions on a daily basis and in crisis situations. Before presentation, this data is optionally analyzed and pretreated by the solution. The data is presented through two views: the Operations view and the Status view.
- Facilitates the return to normal operations through the manual or automatic triggering of standard operating procedures (SOPs).

The objective of the solution is not to replace each of your functional, historical, specialized, and proven systems, for example, geographic information systems (GIS), enterprise asset management (EAM) systems, and supervisory control and data acquisition (SCADA) systems, but rather to collect and correlate just the relevant data that is required for optimal operational control.

2.1. The Operations view

In the Operations view, you can view your data on a geospatial map, on a logical map, or in a list. The data includes:

- Assets, with or without associated sensor readings
- Events, including work orders and alerts from sensors and enterprise systems
- Optionally, data from outside sources, such as weather feeds and Open Data repositories.

Select **My View > List** to view, monitor and manage data items in a list.

Select **My View > Logical Map** to monitor the semantic model in a map, and to show the relationships between a selected asset and other items in the semantic data model. The model is a real world abstraction of the

infrastructure, assets, and measurements. For more information about the semantic model, see [IBM® Intelligent Operations Center product documentation: Populating the infrastructure](#).

Use the Filter window to define what data is displayed. The different filters are grouped into filter panes.

For more information about the Operations view, see [Viewing, filtering and analyzing Device Management Enablement data in the IBM® Intelligent Operations Center product documentation](#).

3. User roles and access

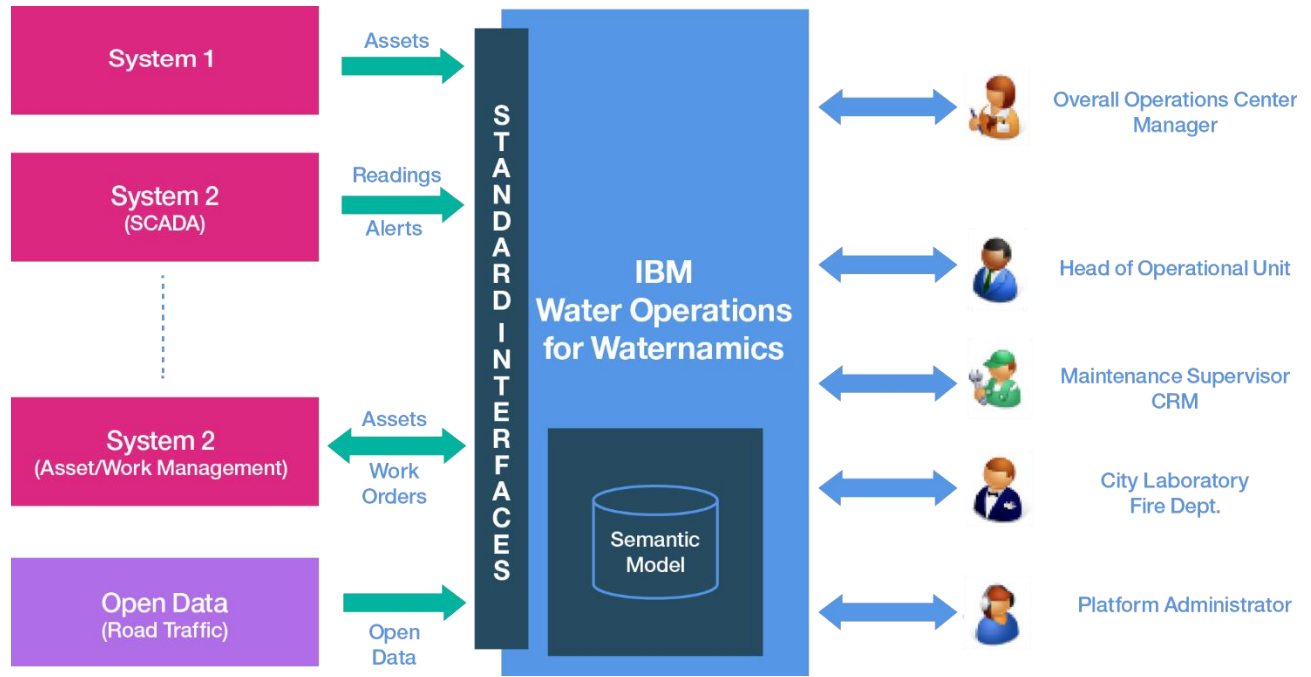


Figure 1: IBM® Water Operations for Waternamics user context

IBM® Water Operations for Waternamics aggregates the data that comes from the different systems within an organization that are responsible for the operation of the water network, as well as data from external systems. These systems can vary from one implementation to another. However, the solution uses predefined interfaces, and the deployment is simplified if you adhere to these interfaces.

After this data is processed, it is presented to the different users according to their profile. The following default roles are installed with the solution. According to the needs of the city in which the solution is deployed, some or all of the roles can be activated:

Label	Dedicated operation view	Performance indicators page
Administrator	X	X
Manager	X	X
Supervisor	X	X
Local authority	X	
Customer Service Center	X	
Water Supply Operative	X	X
Waste Water Operative	X	X
Maintenance Operative	X	X

Label	Dedicated operation view	Performance indicators page
Fireman	X	
Operational Staff	X	X

A user group is created for each profile. One view or "Operations" page is created for each group, so that each group has access to all the data that they need for their role.

4. Filtering data on the maps and list

You can choose the data that you want to display on the maps or in the list, by selecting one or more filters from the Filter window. The filters that are available to you are determined by your user profile. For example, you might choose to filter the data by geospatial location and status.

For more information, see [IBM® Intelligent Operations Center product documentation: Filtering assets on the maps and list](#).

4.1. Filtering data for drinking water networks only

If your deployment is only concerned with the drinking water network, you can use the filters provided with the solution that deal with the drinking water network. These filters are grouped into filter panes in the Filter window. The filter groups include the following:

- Water: Network Fittings
- Water: Zones
- Water: Sensors
- Events
- Water: Customers
- Water: Quality
- Water: Interventions
- Water: Alerts

If necessary, it is possible to reorganize these filters after the solution is installed.

4.2. Filtering data for drinking water networks and wastewater networks

If your IBM® Water Operations for Waternamics solution is only concerned with the drinking water and wastewater networks, you can use the filter groups that are provided with the solution for these networks. The filter groups include the following:

- Water: Network Fittings
- Water: Zones
- Water: Sensors
- Events
- Water: Quality

- Water: Interventions
- Water: Alerts
- Waste water: Sewers
- Waste water: Network elements
- Waste water: Zones
- Waste water: Sensors
- Waste water: Interventions
- Surface area network: Sewers
- Surface area network: Events
- Surface area network: Sites
- Surface area network: Sensors

If necessary, it is possible to reorganize these filters after the solution is installed.

5. Use cases for IBM® Water Operations for Waternamics

5.1. Viewing the network and zones

5.1.1. Water network

5.1.1.1. Pipe sections

You might require that assets are easily identifiable by their attributes on the map. For example, you might require that pipes of a certain diameter are displayed with a specific line thickness, or that the color of the pipe indicates the status of the pipe. Two configurations are available with the solution:

- The pipes are display with a single color and a constant thickness. The color is that of the filter group that you selected.
- Or,
- The width of the line that represents the pipe varies in proportion to the diameter of the pipe section, and the color of the line varies according to the network type and to the status of the pipe section.

If the second solution is adopted, a primary layer presents the pipe sections with their diameter and their network type, and in a secondary layer, color indicates the status of the pipe section. This status is determined by the measurement readings and their correspondence with the value of the attribute of the same name from the GIS. This means that if the GIS shows a status that differs from the status recorded by the readings, then the pipe color indicates an anomaly. Otherwise, the color indicates a normal status.

If no readings are available, the status is determined based on the current value declared at the asset level, as shown in the following table:

	Attribute ENABLED ("Filled")	No reading	Status
Sections (class: Esri.wMain)	value = 1, Enabled	None	value = 0 (normal threshold) – Green
	value = 0, Disabled	None	value = 2 (critical threshold) - Red

5.1.2. Zoning and efficiency

You can display piezometric level zones.

5.1.2.1. Piezometric levels

IBM® Water Operations for Waternamics displays piezometric level zones. The zone data must be supplied through the assets interface. The polygon assets that belong to the same piezometric level are displayed as well as all the assets that are logically associated to the level, for example, sensors and equipment. An asset property indicates the zone to which the asset belongs.

Select a piezometric level to display its characteristics. The polygons that are associated with each piezometric level have a fill color.

Two solutions are possible for displaying piezometric levels:

- Either the zones are displayed with a uniform fill color and are distinguished by the representation of their edges.

Or,

- The zone is displayed in a separate color that is specified in the interface to reflect the piezometric level of the zone. This information is fed back through the assets interface. The line color reflects the status of the zone in relation to the associated reading types and configured thresholds.

The colors, reading types and thresholds to associate with each piezometric level are sent to the solution based on the assets interface. The "status" colors are the IBM® Water Operations for Waternamics standard status colors. The five statuses are undetermined, no values, acceptable, caution, and critical.

5.1.3. Assets interface

Asset data is updated through the assets interface.

Description

Interface identifier	I1
Interface name	IOW-IN-ASSETS-CORE
Input data format	XML
Output data format	RDF/ IBM® Water Operations for Waternamics format
Interface client	IBM® Water Operations for Waternamics

Example of partners for this interface (*)	There are reusable connectors for the ESRI and GAMA systems.
Interface typology	<p>Batch Mode with a twice-daily frequency. Data is loaded initially during the platform installation, and then by daily additions or updates.</p> <p>Important: the initial load time can take some time.</p>

Note: For all the interfaces, the only requirement for the tool that provides the source data is that the tool supports the data format.

Data format

The data that is handled by this interface is in XML format. The format is described in the XSD file, [VDS_IOW-IN-ASSETS-CORE.xsd](#).

5.2. Viewing equipment and sensors

5.2.1. General behavior

Select the relevant filters to display the assets on the map. The assets are displayed whether or not they have associated measurement readings.

You can configure asset types so that the assets are displayed as follows:

- A status is displayed in line with the value of readings that are sent by an external system or that are calculated by the solution.
- You can filter the display based on this status or the selection of an IBM® Water Operations for Waternamics geographic zone.
- The asset icon is determined by the asset type configuration.

These asset types are displayed on the map as follows:

- A unique icon is displayed per data item.
- If multiple data items are within a specific distance from each other, a cluster icon is used to represent the group of nearby data items on the map.
- The asset icon has a background color based on the filter pane that is associated with the layer that includes the asset.
- The asset icon has a status frame colored according to previously configured thresholds and the associated reading. This frame is disabled when the readings are unavailable.

You can also configure server-side rendering for asset layers that are likely to display more than 3,000-5,000 assets simultaneously on a map. For more information on server-side rendering, see [IBM® Intelligent Operations Center product documentation: Optimizing map rendering](#). Currently, only the network is server-side rendered.

5.2.2. Assets and asset status

5.2.2.1. Valve status on feeders

The requirement here is to display the position of valves and their properties, where each valve displayed has a status that is different to its expected status. For example, where a valve is open when it should be closed, or vice versa.

The expected status is provided by the operators' systems. This status is sent to IBM® Water Operations for Waternamics through the assets interface.

The actual status is sent as a measure through the readings interface.

- You can filter by the equipment type that is defined for valves in the semantic model. The resulting layer displays valve data based on the rule outlined in the following table. The color does not denote the normal/abnormal cases but instead the color specifies whether the valve is open (green) or closed (red). Orange shows a valve that is "temporarily" closed:

	Attribute CURROPEN ("Currently open")	CURROPEN reading ("Currently open")	Status
Valve (class: Esri.wSystemValve)	value = 1, "Valve Open"	value = 1, "Valve Open"	value = 0 (Acceptable threshold) - Green
	value = 1, "Valve Open"	value = 0, "Valve Closed"	value = 1 (Caution threshold) - Orange
	value = 0, "Valve Closed"	value = 0, "Valve Closed"	value = 2 (Critical threshold) - Red
	value = 0, "Valve Closed"	value = 1, "Valve Open"	value = 0 (Acceptable threshold) -Green

If no reading is available, the status will be determined on the basis of the current value declared at the asset level:	Attribute CURROPEN ("Currently open")	No reading	Status
Valve (class: Esri.wSystemValve)	value = 1, "Valve Open"	None	value = 0 (Acceptable threshold) – Green
	value = 0, "Valve Closed"	None	value = 2 (Critical threshold) - Red

Therefore, it is possible to filter valves data based by the status of the valves, and to display the open, closed or temporarily closed valves.



5.2.2.2. Network assets

5.2.2.2.1. Hydrants

The position and properties of hydrants can be displayed. The display varies according to a reading that characterizes the status of the fire hydrant. Similar to the display of valves, a rule is applied to display hydrants according to the attribute/reading correspondence.

You can filter by the asset type that is defined for hydrants in the semantic model. The resulting layer displays hydrant data based on the rule outlined in the following table.

The color does not give the normal/abnormal cases but specifies whether the hydrant is filled (green) or dry (red). Orange shows the hydrants that are "temporarily" dry.

Hydrants (class: Esri.wHydrant)	Attribute ENABLED ("Filled")	Reading ENABLED ("Filled")	Status
	value = 1, "Filled hydrant"	value = 1, "Filled hydrant"	value = 0 (Acceptable threshold) – Green
	value = 1, "Filled hydrant"	value = 0, "Dry hydrant"	value = 1 (Caution threshold) – Orange
	value = 0, "Dry hydrant"	value = 0, "Dry hydrant"	value = 2 (Critical threshold) - Red
	value = 0, "Dry hydrant"	value = 1, "Filled hydrant"	value = 0 (Acceptable threshold) -Green

If no reading is available, the status is determined based on the current value declared at the asset level:

Hydrants (class: Esri.wHydrant)	Attribute ENABLED ("Filled")	No reading	Status
	value = 1, "Filled hydrant"	None	value = 0 (Acceptable threshold) – Green
	value = 0, "Dry hydrant"	None	value = 2 (Critical threshold) - Red

The hydrant data is supplied through the assets interface and the hydrant readings (including opening) are supplied through the readings interface.

Icon for hydrants	
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5.2.2.2.2. Washouts

You can filter by the asset type that is defined for a washout in the semantic model. The resulting layer displays the position and the properties of the washouts. The permanent flow alerts for washouts can also be displayed.

Difference analysis:


There is a dedicated alert layer to display the permanent flow alerts

There are two separate layers, one "asset" layer and one "alert" layer.

The washout data is supplied through the assets interface and the readings are supplied through the readings interface.

The "Permanent flow" alerts at the level of the washouts are fed back in IBM® Water Operations for Waternamics through the alerts interface.



At the equipment level, a specific properties box is used to view the list of alerts associated with the washout.

Icon for washouts	
--------------------------	---

5.2.2.2.3. Pressure-reducing valves


You can view the position of the reducing valves that do not have a special symbol rule, that is reducing valves that do not have a Red/Amber/Green status. You can also view the upstream and downstream pressure of the associated pressure sensors.

- A layer is displayed for pressure reducing valve assets.
- A layer is displayed for pressure sensor assets.
- The sensor pressures from the reducing valves are displayed in the logical view.

Icon for pressure reducing valves	
Icon for pressure sensors	

5.2.2.2.4. District metering area meters

The view displays the position of the district metering area meters.

Icon for district metering area meters	
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5.2.2.2.5. Interconnections







The view displays the position of the interconnections. A layer is displayed for interconnections.

Icon for interconnections	
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5.2.2.3. Plant assets

The position and properties of the pumping stations, reservoirs and plants are displayed with a single icon per building type.

A filter is defined for each type of plant asset or installation, for example, reservoirs/water towers, water elevation plants, and boosting stations.

Icon for reservoirs	
Icon for Water elevation plants	
Icon for Water catchments	
Icon for Alert stations	
Icon for production plants	
Icon for Boosting plants	

5.2.2.4. Pressure sensors

The plant pressure sensors and their status are treated in the same way as pressure sensors on the network.

Icon for pressure sensors	
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5.2.2.5. KAPTA™ sensors

The KAPTA™ sensors and their status are treated in the same way as pressure sensors on the network.



Icon for KAPTA™ sensors	
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5.2.2.6. Self-monitoring sample points

The position and properties of the sampling points must be displayable. You must be able to view the self-monitoring sample points, as well as the regulatory sample points.

The status of the sampling points is determined by the result of the last analysis.

One layer is created for the sampling points of the self-monitoring program, and one layer for the regulatory monitoring points.

Icon for self-monitoring sample points	
Icon for regulatory sample points	

5.2.2.7. Plant outlet sensors

These sensors are single-reading sensors, and include chlorine, turbidity and temperature sensors.

The position and properties of these sensors can be displayed

Their status is determined by comparing the measurement with a defined threshold for their type.

A layer is created for all plant outlet sensors.

Icon for plant outlet sensors	
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5.2.3. Assets interface

Sensor and plant assets are updated through the assets interface.

Description

Interface identifier	I1
Interface name	IOW-IN-ASSETS-CORE
Input data format	XML
Output data format	RDF/ IBM® Water Operations for Waternamics format
Interface client	IBM® Water Operations for Waternamics
Interface typology	Batch Mode with a twice daily frequency

Data format

The data handled by this interface is in XML format. The data format is described by the XSD file, [VDS_IOW-IN-ASSETS-CORE.xsd](#).

5.3. Viewing asset properties

5.3.1. General behavior

Click on an asset to display a preview card that contains the item’s properties. These properties are returned in IBM® Water Operations for Waternamics through the assets interface.

5.3.2. Viewing additional information on an external server

Some equipment can be associated with a hypertext link, for example, a link to a PDF document stored in the data warehouse.

If a URL attribute is present, the attribute is returned through the assets interface in the form of a hypertext link.

5.3.3. Viewing the alerts and work orders associated with an asset

To view the alerts and orders associated with the selected asset, click **More Information** on the preview card.

5.3.4. Assets interface

Asset properties are synchronized through the assets interface.

Description

Interface identifier	I1
Interface name	IOW-IN-ASSETS-CORE
Input data format	XML
Output data format	RDF/ IBM® Water Operations for Waternamics format
Interface client	IBM® Water Operations for Waternamics
Interface typology	Batch Mode with a twice daily frequency

Data format

The data that is handled by this interface is in XML format. The format is described in the XSD file [VDS_IOW-IN-ASSETS-CORE.xsd](#).

5.4. Searching for assets

5.4.1. General behavior

There are three ways to search for an asset in IBM® Water Operations for Waternamics:

- Search for the asset by its identifier on the map
- Search for the asset by its identifier in the logical map
- Search for the asset by its address

5.4.2. Search for assets on the map

To search for an asset using the asset identifier, click **Search for an asset** in the Filter window, enter the identifier, and click **Search**. The preview card for the asset is displayed on the map.

5.4.3. Search by identifier on the logical map

You can also search for an asset by its IBM® Water Operations for Waternamics identifier on the logical map. After you select an asset, a context menu allows you to see it on the map view.

5.4.4. Search by address on the map

To search by address, click **Search by address** in the Filter window, and enter a location. A successful search repositions the map at the address.

5.5. Viewing readings and status for assets

5.5.1. General behavior

One or more readings can be associated with each asset. For each reading, the comparison between the reading and the values of the defined thresholds is displayed by a color code at the reading level. There are three standard thresholds with predefined colors. The thresholds are defined by asset or by asset type, and are applied automatically on each asset.

One of the readings is qualified as the main reading, and determines the color of the icon status on the map. This main reading is defined per asset type.

In IBM® Water Operations for Waternamics, only three thresholds can be defined:

- Acceptable: displayed in green
- Caution: displayed in orange
- Critical: displayed in red

When the reading is outside of threshold, and so cannot be used to determine the level, the status is uncertain and is grayed out.

Example:

Define the three thresholds with the following limits:

- Acceptable: Greater than or equal to 0 and less than -5
- Caution: Greater than or equal to 0 and less than 100
- Critical: Greater than or equal to 100 and less than 200

The result is that the lower limit is excluded and the upper limit is included. For example:

- if Value = -50, the level = **Undetermined** (gray), as outside of the limits
- if Value = 0, the level = **Acceptable** (green)
- if Value = 100, the level = **Caution** (orange)
- if Value = 200, the level = **Critical** (red),
- if Value = 250, the level = **Undetermined** (gray), as outside of the limits

The reading types and thresholds are defined for each asset through the assets interface. The readings are imported into IBM® Water Operations for Waternamics through the readings interface.

5.5.2. Asset status

An asset status is determined by the worst of the readings for the asset. For example, if three types of reading are involved, and one of them is critical and the other two are normal, then the asset status is indicated as critical, and so addresses the issue of overall compliance.

5.5.2.1. Pressure sensors and pressure reducing valves

A pressure sensor is characterized by six properties. Values for these properties are imported into IBM® Water Operations for Waternamics through the readings interface. The properties are:

- Pressure
- Maintenance state
- Error state (if the sensor is defective or not)
- Short Term error
- Long Term error
- General error

The error values indicate problems with the sensor. The "General error" reading is the maximum value of the other errors. This value indicates the sensor's overall status.

If the pressure sensor is associated with a pressure-reducing valve, the sensor's pressure reading can be considered as a characteristic of the reducing valve and the sensor's general error should be taken into account to determine the status of the reducing valve. To find the associated values, you can navigate the logical view from parent to child and see the relevant readings and statuses.

A maintenance reading is also associated with the pressure-reducing valve.

5.5.2.2. KAPTA™ sensors

A KAPTA™ sensor is qualified by four measurements: chlorine, conductivity, pressure, and temperature.

As with the water quality readings, the sensor's overall status is determined by the worst reading, which is determined according to the reading thresholds.

5.5.2.3. Flow readings

Flow and pressure sensors are associated with production units. You can view logs and statuses for these readings from the sensors.

Knowing the status and readings of sensors associated with a production unit is advantageous. The information can be obtained by navigating to the associated sensors through the logical view.

You can filter by each type of sensor.

5.5.2.4. Interconnection readings

A metering point, a gate, a pressure sensor, and a pressure-regulating valve are associated with each interconnection.

You can filter by equipment type and by interconnection.

You can navigate the logical view to obtain the flow readings, gate status, pressure readings, and regulating valve status stemming from the interconnection equipment.

5.5.2.5. Zoning and efficiency

Nocturnal flow and volume readings are associated with the zoning meters.

Filters are defined for the zoning meters.

Obtaining the information through the piezometric zones to which the meters are associated is advantageous. You can find this information in the logical view.

5.5.3. Readings interface

The equipment analysis readings are updated through the readings interface

Description

Interface identifier	I2
Interface name	IOW-IN-READINGS-CORE
Input data format	XML
Output data format	CSV / IBM® Water Operations for Waternamics format
Interface client	IBM® Water Operations for Waternamics
Interface typology	Batch Mode with frequency to be determined

Data format

The data that is handled by this interface is in XML format. The format is described in the XSD file [VDS IOW-IN-READINGS-Core.xsd](#).

5.6. Viewing reservoirs and levels

5.6.1. General behavior

The behavior for reservoirs is the same as the behavior for equipment and status monitoring. The status is dependent upon the levels of the tanks that are imported through the readings interface, and the status of the worst tank is used.

5.7. Event and alert management

5.7.1. General behavior

For a specific layer, events can be created automatically by the system and you can also create alerts manually. Alerts are generated automatically through the alerts interface.

5.7.1.1. Icons

Event or alert types are identified within a specific layer. An icon that identifies the event or alert on the map is associated with each filter group. The icon's background color matches the filter group's color.

Event or alert types are identified with a specific icon. A background color is associated with each filter group, and the "outline" color indicates the event status:

- Closed: Green
- Non closed (Suspected, Treatable, To be treated): Red



Examples:

When you select one or more filters in the Filter window, the events and alerts that are associated with the resulting layer are displayed on the map.

To display the attributes for an event or an alert, click on event or alert icon on the map. You can also update or cancel the event or the alert.

5.7.1.2. Statures

The four event and alert statuses are as follows:

- Suspected
- Treatable
- To be treated
- Closed

To acknowledge an event or an alert, click **More Actions** on the preview card for the alert or event, and click **Acknowledge event/alert**.

The value "yes" is assigned to the **Acknowledged** field of the event or alert, and the current date is displayed in the **End Date** field.

Acknowledged events or alerts are not removed and remain viewable according to the filter applied to the "Acknowledged" field. By default, all events and alerts are visible whether they are acknowledged or not.

You cannot add comments during an alert acknowledgment operation. However, you can add comments before or after the acknowledgment operation by clicking **More Actions > Update**.

5.7.1.3. Filters

You can filter events and alerts by:

- Type (only one type per layer)
- Status
- Associated zone
- Acknowledgment (acknowledged or not)
- Person who created the event or alert
- Date

When a date filter is applied, only the events with a start date between the search start date and end date are displayed.

5.7.2. Event features












5.7.2.1. Types of events

The following event types can be displayed:

- Emergency leak
- Fire
- Water theft
- Climatic event
- Other

5.7.2.2. Icons

A specific icon identifies each event type.

Event	Icon
Major water quality non compliance	
Visible and emergency leak	
Fire	
River contamination	
Major flood	
Dam release	
Water theft	
Heat wave	
Cold spell	
Major storm	
Enhanced safety constraints	

5.7.2.3. Creating events

To create an event, first select one or more filters in the Filter window to display the required data layer. Click **More Actions>New item**, and then drag and drop the new item on to the map to select the geographical position.

The following fields are populated automatically:

- **Created by** is completed with the relevant user login.
- The **Piezometric zone** field is already completed with the zone where the event is taking place (based on a geospatial query)
- Coordinates, based on the position selected by drag and drop
- The event's **Address** attribute is updated with the ESRI geolocation service that is invoked based on the coordinates. You can manually adjust the address, and the coordinates are then updated using the same geolocation service

5.7.3. Alert features

5.7.3.1. Types of alerts to view

The types of alerts include:

- Backflows
- Permanent leakages
- Intrusion
- Mobile meters alerts
- Leaks
- Gutermann correlation leaks

5.7.3.2. Icons

Each alert type is identified with a specific icon.

Alert	Icon
Backflow	
Continuous flow	
Intrusion	
Mobile meters	
Gutermann correlation leak	
Defective pressure reducing valves	

5.7.3.3. Creating alerts

Alerts are generated only through the alerts interface.

5.7.3.4. Alert notifications and zoom

Notifications are sent according to the following rules:

- If the alert is urgent (Y in the Urgency field of the alerts interface) and the status is "Non-closed" then a critical notification triggers the display of a message in the banner and an audible alarm.
- If the alert is not urgent and the status is "Non-closed", then a "To be monitored" notification is sent.
- Otherwise, a normal notification is sent.

Open the notification to display the alert on the map.

5.7.3.5. Triggering a standard operating procedure

When IBM® Water Operations for Waternamics triggers an alert, a Standard Operating Procedure (SOP) can be triggered automatically. Refer to the [Standard Operating Procedure](#) section for a description of the procedures that are implemented.

5.7.4. Alerts interface

Alerts in IBM® Water Operations for Waternamics are updated through the alerts interface.

Description

Interface identifier	I3
Interface name	IOW-IN-ALERTS-CORE
Input data format	XML
Output data format	CAP/CSV/ IBM® Water Operations for Waternamics format
Interface client	IBM® Water Operations for Waternamics
Interface typology	Batch Mode with frequency to be determined

Data format

The data handled by this interface is in XML format. The format is described in the XSD file [VDS IOW-IN-ALERTS-CORE 1.7.xsd](#)

5.8. Viewing work orders and their status

5.8.1. General behavior

The visual representation of a work order is similar to that of events or alerts.

You can filter by work order type and by work order properties. When a date filter is applied, only the work orders that have a start date between the search start date and end date are displayed.






Types of work orders:

- Customer work orders
- Network work orders
- Plant work orders
- Street works
- Water shutoffs

5.8.2. Work order features

5.8.2.1. Icons

A specific icon identifies each work order type.

Work order	Icon
Customer work orders	
Plant work orders	
Network work orders	
Street works	
Water shutoffs	

The outline of the icon depends on the status of the work order:

- Work order completed: GREEN
- Work order scheduled over a period that is either in the past or future and does not cover the current date: ORANGE
- Work order in progress (scheduled over a period covering the current date): RED

The icon's background color is associated with the filter group to which the work order is associated.

5.8.2.2. Viewing the position of response vehicles

The fleet tracking data source can load the position of response vehicles and their properties into IBM® Water Operations for Waternamics. The properties include associated unit and type. You can display the vehicles' last known position on the map, with a specific icon for each vehicle type.

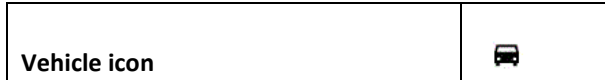
Update queries are triggered periodically when you display the layer. Click on an icon to display the values sent by the fleet tracking data source:

- Vehicle identifier
- Name of the agent associated with the vehicle
- Vehicle registration number
- Associated group or unit
- Vehicle status
- Driver's cell phone
- Date and time of last update on the fleet tracking site
- Vehicle state
- Vehicle speed
- GPS status

This data is not stored in IBM® Water Operations for Waternamics. This is only a geographical overlay.

The outline color of the icon is determined by the status of the vehicle:

- Vehicle moving (green)
- Engine on but vehicle not moving (amber)
- Engine off (red)
- Undetermined, status unknown (gray)



5.8.2.3. Viewing traffic conditions

The traffic data source loads the traffic conditions of urban areas on the platform.

5.8.3. Creating a work order

5.8.3.1. Creating an independent work order

To create a work order, first select the required filter to display the data layer, and then click **More Actions>New Item**. Select the type of item you want to add and drag it onto the map. Enter the values in the Add New Item window and click **Save**. The work order is immediately displayed on the map with a status of Planned.

When the external system receives the request, you will receive a notification. You are notified when the external system has processed the request. The status of the request is then Scheduled or Completed.

You can view the progress of the work order status directly by displaying the work order properties.

5.9. Standard operating procedures (SOPS)

5.9.1. Overview

The solution includes a manual or automatic system that activates standard operating procedures. These procedures can include one or more activities, some of which can be aimed at specified users or users within a user group; others initiate a fully automated process or workflow. For more information about SOPs, see [Configuring standard operating procedures](#) in the IBM® Intelligent Operations Center product documentation.

5.9.2. SOPs provided with the solution

With the solution, the administrator can create specific procedures, whether they comprise only manual activities or a fully automated process.

For example, the solution provides the following procedures, which implement a fully automated process:

- **Event management:** When an event is created, the procedure and its automated process are initiated. For example, the automated process verifies the event's zone, and an email is sent to one or more recipients, as necessary, before completing the procedure automatically.
- **Alert management:** When an alert is created (by interface) in the platform, the procedure and its process are initiated. For example, the automated process generates a message that allows for the creation of an intervention per interface, then waits for the request to be either acknowledged or rejected, then notifies a group of users, both through email and through an application notification, before completing the procedure.
- **Exceeded threshold management:** When a reading exceeds the critical threshold configured in the platform, an email or application notification can be initiated by a procedure and its automated process.

These procedures and associated automated processes require configuration to activate the procedures depending on the type of event, the alert and the threshold exceeded. Email and notification recipients and contents can also be configured.

5.9.3. Configuring the automated procedures and processes

The solution provides graphical tools, available through a web browser, that are used to configure the procedures, manual activities and automated processes, whether those described previously or new ones.

When designing an automated process, the designer can base the process logic on the value of the main attributes of the data from which the procedure is derived (for example, event, alert, reading, and so on). You can select the actions to be carried out by the process from the actions library that is provided with the solution:

- Send a notification
- Send an email
- Change the intervention status
- Close the activity automatically

Appendix A: XSD files for version 5.2.1.1

ALERTS SCHEMA FOR V5.2.1.1

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
/*
* Licensed Materials - Property of Veolia Environment-VE and IBM
*
* 5725-D69
* © Copyright Veolia Environment-VE 2017, 2018.
* © Copyright International Business Machines Corporation 2012, 2018.
*
* For IBM Corporation provided versions, releases and modifications: US Government Users
* Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
* with IBM Corporation.
*/

V1.8
-->
<xsd:schema targetNamespace="http://vds.com/alertsType"
  xmlns:alert="http://vds.com/alertsType"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:element name="operations">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element minOccurs="1" maxOccurs="unbounded" name="record" type="alert:recordType"/>
      </xsd:sequence>
      <xsd:attribute name="rootTenant" type="xsd:string" />
      <xsd:attribute name="flowSource" type="xsd:string" />
      <xsd:attribute name="timeout" type="xsd:string" />
      <xsd:attribute name="timeoutTypeeld" type="xsd:string" />
      <xsd:attribute name="requestType" type="xsd:string" />
    </xsd:complexType>
  </xsd:element>
  <xsd:complexType name="recordType">
    <xsd:annotation>

```

```

<xsd:documentation>Event data source record</xsd:documentation>
</xsd:annotation>
<xsd:all>
  <!--
    * Minimal properties
  */
  -->
  <xsd:element name="EXTEVENTID" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="TENANT_ID" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="MODEL_ID" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="STARTTS" type="alert:iibDateTime" minOccurs="1" maxOccurs="1" />
  <xsd:element name="LASTUPDATEDTS" type="alert:iibDateTime" minOccurs="1" maxOccurs="1" />
  <xsd:element name="SUBJECT" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="CATEGORY" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="EVENTYPE" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="EVENTSUBTYPE" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="COSTS" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="CONSEQUENCES" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="CREATIONTYPE" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="NETWORK" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="DOMAIN" type="xsd:string" minOccurs="1" maxOccurs="1" />
  <xsd:element name="STATUS" type="xsd:string" minOccurs="1" maxOccurs="1" />

  <xsd:element name="ENDTS" type="alert:iibDateTime" minOccurs="0" maxOccurs="1" />
  <xsd:element name="EXTWORKEQUIPMENTID" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="EXTWORKEQUIPMENTTYPE" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="LOCATION" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="DESCRIPTION" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="ADDRESS" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="OWNER" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="CREATEDBY" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="URGENCY" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="CERTAINTY" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="ZONE" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="SEVERITY" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="ACK" type="xsd:string" minOccurs="0" maxOccurs="1" />
  <xsd:element name="ASSET_STRING_ID" type="xsd:string" minOccurs="0" maxOccurs="1" />

```

```

<xsd:element name="MEASURE" minOccurs="0" maxOccurs="1" >
  <xsd:annotation>
    <xsd:documentation>threshold attribute domain is 0..1</xsd:documentation>
  </xsd:annotation>
  <xsd:complexType>
    <xsd:attribute name="value" type="xsd:string" />
    <xsd:attribute name="unit" type="xsd:string" />
    <xsd:attribute name="type" type="xsd:string" />
    <xsd:attribute name="threshold_value" type="xsd:string" />
    <xsd:attribute name="threshold" type="xsd:string" />
  </xsd:complexType>
</xsd:element>
</xsd:all>
</xsd:complexType>
<xsd:simpleType name="iibDateTime">
  <xsd:restriction base="xsd:string">
    <xsd:pattern
Value= "\d{4}-(0[1-9]|1[012])-(0[1-9]|[12][0-9]|3[01])\s(0[0-9]|[1][0-9]|2[0-3]):([0-5][0-9]):([0-5][0-9]).([0-9]{3})"/>
    </xsd:restriction>
  </xsd:simpleType>
</xsd:schema>

```


ASSETS SCHEMA FOR V5.2.1.1

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
/*
* Licensed Materials - Property of Veolia Environment-VE and IBM
*
* 5725-D69
*
* © Copyright Veolia Environment-VE 2017, 2018.
* © Copyright International Business Machines Corporation 2015, 2018.
*
* For IBM Corporation provided versions, releases and modifications: US Government Users
* Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
* with IBM Corporation.
*/

V1.8
-->
<xsd:schema targetNamespace="http://vds.com/assetTypes"
  xmlns:asset="http://vds.com/assetTypes"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="modelrefType">
    <xsd:annotation>
      <xsd:documentation>modelref will refer to the ID of the semantic
        model for a multi tenant environment.
        If the id attribute of modelref
        is empty all the request will
        executed played against the default model. </xsd:documentation>
      </xsd:annotation>
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" name="request" type="asset:requestType" />

```

```

</xsd:sequence>
<xsd:attribute name="id" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="relationType">
  <xsd:annotation>
    <xsd:documentation>
      RelationType describes relationships between assets.
    </xsd:documentation>
  </xsd:annotation>
  <xsd:attribute name="relationName" type="xsd:string" />
  <xsd:attribute name="targetExtWorkEquipmentType" type="xsd:string" />
  <xsd:attribute name="targetExtWorkEquipmentId" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="relationsType">
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" minOccurs="1" name="relation" type="asset:relationType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="thresholdType">
  <xsd:attribute name="range" type="xsd:string" />
  <xsd:attribute name="level" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="unbounded" name="threshold" type="asset:thresholdType" />
  </xsd:sequence>
  <xsd:attribute name="unit" type="xsd:string" />
  <xsd:attribute name="no_reading_timeout" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />

```

```

<xsd:attribute name="measureLabel" type="xsd:string" />
<xsd:attribute name="isPrimaryMeasurement" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypesType">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="measureType"
      type="asset:measureTypeType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="attributeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="1" name="value"
      type="xsd:string" />
    <xsd:element minOccurs="0" maxOccurs="1" name="unit"
      type="xsd:string" />
  </xsd:sequence>
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="assetType">
  <xsd:annotation>
    <xsd:documentation>
      AssetType is to describe the asset to create/update/delete.
    </xsd:documentation>
  </xsd:annotation>
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="1" name="internalLocation" type="xsd:string" />
    <xsd:element minOccurs="0" maxOccurs="1" name="relations" type="asset:relationsType" />
    <xsd:element minOccurs="0" maxOccurs="unbounded" name="attribute" type="asset:attributeType" />
  </xsd:sequence>

```

```

    <xsd:element minOccurs="0" name="measureTypes" type="asset:measureTypesType" />
</xsd:sequence>
<xsd:attribute name="extWorkEquipmentType" type="xsd:string" />
<xsd:attribute name="extWorkEquipmentId" type="xsd:string" />
<xsd:attribute name="assetLabel" type="xsd:string" />
<xsd:attribute name="assetDescription" type="xsd:string" />
<xsd:attribute name="tenantId" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="requestType">
  <xsd:annotation>
    <xsd:documentation>
      Request is the actual operation that will
      be executed. It captures the following informations :
      - request type :
      CREATE / UPDATE / DELETE
      - Assets data (attributes, relations etc...)
      the request type must be one of the following :
      - INSERT : create an asset.
      - DELETE : delete an asset.
      - UPDATE : update an asset.
    </xsd:documentation>
  </xsd:annotation>
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" name="asset" type="asset:assetType" />
  </xsd:sequence>
  <xsd:attribute name="type" type="xsd:string" />
</xsd:complexType>
<xsd:element name="operation">
  <xsd:annotation>

```

```
<xsd:documentation>
```

Operation is the root element of the xml file. It

will contain all the requests.

rootTenant : root tenant for the ingested data.

timestamp : xml file generation date.

```
</xsd:documentation>
```

```
</xsd:annotation>
```

```
<xsd:complexType>
```

```
<xsd:sequence>
```

```
<xsd:element maxOccurs="unbounded" name="modelref" type="asset:modelrefType" />
```

```
</xsd:sequence>
```

```
<xsd:attribute name="rootTenant" type="xsd:string" />
```

```
<xsd:attribute name="flowSource" type="xsd:string" />
```

```
<xsd:attribute name="timestamp" type="xsd:string" />
```

```
<xsd:attribute name="timeout" type="xsd:string" />
```

```
<xsd:attribute name="timeoutTypeId" type="xsd:string" />
```

```
</xsd:complexType>
```

```
</xsd:element>
```

```
</xsd:schema>
```

MEASUREMENT READINGS SCHEMA FOR V5.2.1.1

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
/*
* Licensed Materials - Property of Veolia Environment-VE and IBM
*
* 5725-D69
*
* © Copyright Veolia Environment-VE 2017, 2018.
* © Copyright International Business Machines Corporation 2012, 2018.
*
* For IBM Corporation provided versions, releases and modifications: US Government Users
* Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
* with IBM Corporation.
*/

V1.8
-->
<xsd:schema targetNamespace="http://vds.com/readingsTypes"
  xmlns:readings="http://vds.com/readingsTypes" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="readingValueType">
    <xsd:attribute name="value" type="xsd:string" />
    <xsd:attribute name="type" type="xsd:string" />
  </xsd:complexType>
  <xsd:complexType name="readingValuesType">
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" name="readingValue" type="readings:readingValueType" />
    </xsd:sequence>
  </xsd:complexType>
  <xsd:complexType name="workEquipmentType">
    <xsd:sequence>
      <xsd:element minOccurs="0" maxOccurs="1" name="description" type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="unbounded" name="relations"

```

```

        type="readings:relationsType" />
    <xsd:element minOccurs="0" maxOccurs="1" name="attributes"
        type="readings:attributesType" />
    <xsd:element minOccurs="0" maxOccurs="1" name="measureTypes"
        type="readings:measureTypesType" />
</xsd:sequence>
<xsd:attribute name="location" type="xsd:string" />
<xsd:attribute name="extType" type="xsd:string" />
<xsd:attribute name="extId" type="xsd:string" />
<xsd:attribute name="modelRef" type="xsd:string" />
<xsd:attribute name="tenantId" type="xsd:string" />
<xsd:attribute name="assetLabel" type="xsd:string" />
<xsd:attribute name="assetDescription" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="readingSetType">
    <xsd:sequence>
        <xsd:element name="workEquipment" type="readings:workEquipmentType" />
        <xsd:element name="readingValues" type="readings:readingValuesType" />
    </xsd:sequence>
    <xsd:attribute name="extReadingSetid" type="xsd:string" />
    <xsd:attribute name="timestamp" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="attributeType">
    <xsd:sequence>
        <xsd:element minOccurs="0" maxOccurs="1" name="value" type="xsd:string" />
        <xsd:element minOccurs="0" maxOccurs="1" name="unit" type="xsd:string" />
    </xsd:sequence>
    <xsd:attribute name="type" type="xsd:string" />
    <xsd:attribute name="name" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="attributesType">
    <xsd:sequence>
        <xsd:element minOccurs="0" maxOccurs="unbounded" name="attribute"
            type="readings:attributeType" />
    </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="relationType">

```

```

<xsd:attribute name="targetExtWorkEquipmentType" type="xsd:string" />
<xsd:attribute name="targetExtWorkEquipmentId" type="xsd:string" />
<xsd:attribute name="type" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="relationsType">
  <xsd:sequence>
    <xsd:element name="relation" type="readings:relationType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="thresholdType">
  <xsd:attribute name="range" type="xsd:string" />
  <xsd:attribute name="level" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="unbounded" name="threshold"
      type="readings:thresholdType" />
  </xsd:sequence>
  <xsd:attribute name="unit" type="xsd:string" />
  <xsd:attribute name="no_reading_timeout" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />
  <xsd:attribute name="measureLabel" type="xsd:string" />
  <xsd:attribute name="isPrimaryMeasurement" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypesType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="unbounded" name="measureType"
      type="readings:measureTypeType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="readings">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" name="readingSet" type="readings:readingSetType" />
    </xsd:sequence>
    <xsd:attribute name="rootTenant" type="xsd:string" />
    <xsd:attribute name="flowSource" type="xsd:string" />
  </xsd:complexType>
</xsd:element>

```



```
<xsd:attribute name="timeout" type="xsd:string" />  
  <xsd:attribute name="timeoutTypeeld" type="xsd:string" />  
</xsd:complexType>  
</xsd:element>  
</xsd:schema>
```

SERVICE ORDERS SCHEMA FOR V5.2.1.1

```

<?xml version="1.0" encoding="UTF-8"?>

<!--
#
# Licensed Materials - Property of Veolia Environment-VE
#
# © Copyright Veolia Environment-VE 2016, 2018.
#
# Users Restricted Rights - Use, duplication or
# disclosure restricted by Contract with Veolia Environment-VE
#
-->
<xsd:schema targetNamespace="http://vds.com/serviceOrdersType"
  xmlns:so="http://vds.com/serviceOrdersType" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="requestType">
    <xsd:sequence>
      <xsd:element minOccurs="1" maxOccurs="unbounded" name="serviceorder" type="so:serviceOrder" />
    </xsd:sequence>
    <xsd:attribute name="type" type="xsd:string" />
  </xsd:complexType>
  <xsd:complexType name="serviceOrder">
    <xsd:all>
      <xsd:element minOccurs="0" maxOccurs="1" name="EXTERNAL_ID"
        type="xsd:string" />
      <xsd:element minOccurs="1" maxOccurs="1" name="TENANT_ID"
        type="xsd:string" />
      <xsd:element minOccurs="1" maxOccurs="1" name="EAM_ID"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="GIS_ID"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="SITE_ID"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="NAME"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="DESCRIPTION"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="REGISTRATION_NO"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="LOCATION"
        type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="1" name="ADDRESS"
        type="xsd:string" />
    </xsd:all>
  </xsd:complexType>
</xsd:schema>

```

```

<xsd:element minOccurs="0" maxOccurs="1" name="REGISTRATION_DATE"
                type="so:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="OPENING_DATE"
                type="so:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="COMPLETION_DATE"
                type="so:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ATTACHMENTS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="COMPLETION_STATUS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="STATUS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="CATEGORY"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="TYPE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="CUSTOMER_ID"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="customServiceOrderAttributes"
                type="so:attributes" />
<xsd:element minOccurs="0" maxOccurs="1" name="assets" type="so:assets" />
<xsd:element minOccurs="0" maxOccurs="1" name="workorders" type="so:workorders" />
</xsd:all>
</xsd:complexType>
<xsd:complexType name="attributes">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="attribute" type="so:attribute" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="assets">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="asset" type="so:asset" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="workorders">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="workorder" type="so:workorder" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="attribute">
  <xsd:attribute name="id" type="xsd:string" />
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="value" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="asset">
  <xsd:attribute name="id" type="xsd:string" />
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="relationshipType" type="xsd:string" />
  <xsd:attribute name="usedForGeoLocation" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="workorder">
  <xsd:attribute name="id" type="xsd:string" />
  <xsd:attribute name="relationshipType" type="xsd:string" />

```

```

</xsd:complexType>
<xsd:simpleType name="iibDateTime">
  <xsd:restriction base="xsd:string">
    <xsd:pattern
value="\d{4}-(0[1-9]|1[012])-(0[1-9]|12)[0-9]|3[01])\s(0[0-9]|1[1][0-9]|2[0-3]):([0-5][0-9]):([0-5][0-9]).([0-9]{3})" />
    </xsd:restriction>
  </xsd:simpleType>
<xsd:element name="operations">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element minOccurs="1" maxOccurs="unbounded" name="request"
                                type="so:requestType">
        </xsd:element>
      </xsd:sequence>
      <xsd:attribute name="rootTenant" type="xsd:string" />
      <xsd:attribute name="flowSource" type="xsd:string" />
      <xsd:attribute name="timeout" type="xsd:string" />
      <xsd:attribute name="timeoutTypeId" type="xsd:string" />
    </xsd:complexType>
  </xsd:element>
</xsd:schema>

```

WORK ORDERS SCHEMA FOR V5.2.1.1

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
#
# Licensed Materials - Property of Veolia Environment-VE
#
# © Copyright Veolia Environment-VE 2016, 2018.
#
# Users Restricted Rights - Use, duplication or
# disclosure restricted by Contract with Veolia Environment-VE
#
-->
<xsd:schema targetNamespace="http://vds.com/workOrdersType"
  xmlns:wo="http://vds.com/workOrdersType" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="requestType">
    <xsd:sequence>
      <xsd:element minOccurs="1" maxOccurs="unbounded" name="workorder">
        <xsd:complexType>
          <xsd:all>
            <xsd:element minOccurs="0" maxOccurs="1" name="DATASOURCEID"
              type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="RECORDID"
              type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="WOEXTID"
              type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="EXTERNAL_ID"
              type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="TENANT_ID"
              type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="MODEL_ID"
              type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="SUBJECT"
              type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="DESCRIPTION"
              type="xsd:string" />
          </xsd:all>
        </xsd:complexType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:schema>

```

```

<xsd:element minOccurs="1" maxOccurs="1" name="DOMAIN"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="CATEGORY"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="WORKORDERTYPE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="WORKTYPE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="SUBTYPE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="FAILURE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="PRIORITY"
                type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="STATUS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="JOBPLAN"
                type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="CREATIONDATE"
                type="wo:iibDateTime" />
<xsd:element minOccurs="1" maxOccurs="1" name="CREATIONTYPE"
                type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="CREATEDBY"
                type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="TARGETSTARTDATE"
                type="wo:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="TARGETENDDATE"
                type="wo:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ACTSTARTDATE"
                type="wo:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ACTENDDATE"
                type="wo:iibDateTime" />
<xsd:element minOccurs="1" maxOccurs="1" name="LASTUPDATEDTS"
                type="wo:iibDateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ZONE"
                type="xsd:string" />

```

```

<xsd:element minOccurs="0" maxOccurs="1" name="LOCATION"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="URL"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="EXTWORKEQUIPMENTID"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="EXTWORKEQUIPMENTTYPE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="UPDATEDBY"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LEAD"
                type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="NETWORK"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="ADDRESS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="PERFORMEDBY"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCOWNERID"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCOWNERDETAILS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCCONTACTID"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="ISSUERCOMPANY"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="AFFECTED"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCCONTACTDETAILS"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="REPORT"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="SITE_ID"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="MAINTENANCE_TYPE"
                type="xsd:string" />

```

```

<xsd:element minOccurs="0" maxOccurs="1" name="ASSET_LENGTH_WORKED_ON"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="ASSET_STATE"
                type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="WORKER_COMMENT"
                type="xsd:string" />
<xsd:element name="SRCEVENTLIST" type="wo:srcEventListType"
                maxOccurs="1" minOccurs="0">
</xsd:element>
<xsd:element minOccurs="0" maxOccurs="1" name="customWorkOrderAttributes"
                type="wo:attributes" />
<xsd:element minOccurs="0" maxOccurs="1" name="assets" type="wo:assets" />
</xsd:all>
</xsd:complexType>
</xsd:element>
</xsd:sequence>
<xsd:attribute name="type" type="xsd:string" />
</xsd:complexType>
<xsd:element name="operations">
<xsd:complexType>
<xsd:sequence>
<xsd:element minOccurs="1" maxOccurs="unbounded" name="request"
                type="wo:requestType">
</xsd:element>
</xsd:sequence>
<xsd:attribute name="rootTenant" type="xsd:string" />
<xsd:attribute name="flowSource" type="xsd:string" />
<xsd:attribute name="timeout" type="xsd:string" />
<xsd:attribute name="timeoutTypeId" type="xsd:string" />
</xsd:complexType>
</xsd:element>
<xsd:complexType name="srcEventType">
<xsd:all>
<xsd:element name="SRCEVTCATEGORY" maxOccurs="1"
                minOccurs="1" type="xsd:string">
</xsd:element>
<xsd:element name="SRCEVTTYPE" type="xsd:string"

```



```

        maxOccurs="1" minOccurs="1">
<xsd:annotation>
  <xsd:documentation>
    For a SRCEVTCATEGORY = ALERT or EVENT, this is
    the IOW EVENTTYPE For a SRCEVTCATEGORY =
    WORKORDER, this is the IOW
    WORKORDER DOMAIN For
    a SRCEVTCATEGORY = NOREADING or
    READINGTHRESHOLD, this is the IOW
    MEASUREMENTTYPE
  </xsd:documentation>
</xsd:annotation>
</xsd:element>
<xsd:element name="SRCEVTID" type="xsd:string" maxOccurs="1"
        minOccurs="0">
  <xsd:annotation>
    <xsd:documentation>
      For a SRCEVTCATEGORY = ALERT or EVENT, this is
      the IOW EXTEVENTID For a SRCEVTCATEGORY =
      WORKORDER, this is the
      IOW WOEXTID For a
      SRCEVTCATEGORY = NOREADING or READINGTHRESHOLD,
      this is the IOW MEASUREMENT_ID (only for WO OUT)
    </xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="SRCEVTDATE" type="wo:iibDateTime" maxOccurs="1" minOccurs="1">
</xsd:element>
<xsd:element name="SRCEVTORIGVALUE" type="xsd:string" maxOccurs="1" minOccurs="0">
</xsd:element>
<xsd:element name="SRCEVTCURRVALUE" type="xsd:string" maxOccurs="1" minOccurs="0">
</xsd:element>
<xsd:element name="SRCEVTCURRVALUESETS" type="wo:iibDateTime"
        maxOccurs="1" minOccurs="0">
</xsd:element>
<xsd:element name="SRCEVTCOMMENT" type="xsd:string"
        maxOccurs="1" minOccurs="0">

```

```

</xsd:element>
  <xsd:element name="SOPREFERENCE" type="xsd:string"
    maxOccurs="1" minOccurs="0"></xsd:element>
</xsd:all>
</xsd:complexType>
<xsd:complexType name="srcEventListType">
  <xsd:sequence>
    <xsd:element name="SRCEVENT" type="wo:srcEventType"
      maxOccurs="unbounded" minOccurs="0"></xsd:element>
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="attributes">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="attribute" type="wo:attribute" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="assets">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="asset" type="wo:asset" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="attribute">
  <xsd:attribute name="id" type="xsd:string" />
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="value" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="asset">
  <xsd:attribute name="id" type="xsd:string" />
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="relationshipType" type="xsd:string" />
  <xsd:attribute name="usedForGeoLocation" type="xsd:string" />
</xsd:complexType>
<xsd:simpleType name="iibDateTime">
  <xsd:restriction base="xsd:string">
    <xsd:pattern
value="\d{4}-(0[1-9]|1[012])-(0[1-9]|[12][0-9]|3[01])\s(0[0-9]|[1][0-9]|2[0-3]):([0-5][0-9]):([0-5][0-9]).([0-9]{3})" />
  </xsd:restriction>
</xsd:simpleType></xsd:schema>

```

Appendix B: XSD files for version 5.2.1

Appendix C: XSD files for version 5.2.0.6

Appendix D: XSD files for version 5.2.0.5

Appendix E: XSD files for version 5.2.0.4

Appendix F: XSD files for version 5.2.0.3

Appendix G: XSD files for version 5.2.0.2

Appendix H: XSD files for version 5.2.0.1

Appendix H: XSD Files for version 5.1 and version 5.2.0

VDS_IOW-IN-ALERTS-CORE_1.7.XSD

```
<?xml version="1.0" encoding="UTF-8"?>
<!--
/*
* Licensed Materials - Property of IBM
*
* 5725-D69
*
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*
* For IBM Corporation provided versions, releases and modifications: US Government Users
* Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
* with IBM Corporation.
*/

V1.8
-->
<xsd:schema targetNamespace="http://vds.com/alertsType"
            xmlns:alert="http://vds.com/alertsType"
            xmlns:xsd="http://www.w3.org/2001/XMLSchema"
            elementFormDefault="qualified">
  <xsd:element name="operations">
    <xsd:complexType>
      <xsd:sequence>
        <xsd:element minOccurs="1" maxOccurs="unbounded" name="record" type="alert:recordType"/>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>
  <xsd:complexType name="recordType">
    <xsd:annotation>
      <xsd:documentation>Event data source record</xsd:documentation>
    </xsd:annotation>
  </xsd:complexType>
  <xsd:all>
    <!--
      * Minimal properties
```

```

*/
-->
<xsd:element name="EXTEVENTID" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="MODEL_ID" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="STARTTS" type="xsd:dateTime" minOccurs="1" maxOccurs="1" />
<xsd:element name="LASTUPDATEDTS" type="xsd:dateTime" minOccurs="1" maxOccurs="1" />
<xsd:element name="SUBJECT" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="CATEGORY" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="EVENTYPE" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="CREATIONTYPE" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="NETWORK" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="DOMAIN" type="xsd:string" minOccurs="1" maxOccurs="1" />
<xsd:element name="STATUS" type="xsd:string" minOccurs="1" maxOccurs="1" />

<!--
    * Key/Full properties
    */
-->

<!-- Either of (EXTWORKEQUIPMENTID + EXTWORKEQUIPMENTTYPE) or LOCATION is required -->
<xsd:element name="ENDTS" type="xsd:dateTime" minOccurs="0" maxOccurs="1" />
<xsd:element name="EXTWORKEQUIPMENTID" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="EXTWORKEQUIPMENTTYPE" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="LOCATION" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="DESCRIPTION" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="ADDRESS" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="OWNER" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="CREATEDBY" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="URGENCY" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="CERTAINTY" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="ZONE" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="SEVERITY" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="ACK" type="xsd:string" minOccurs="0" maxOccurs="1" />
<xsd:element name="MEASURE" minOccurs="0" maxOccurs="1" >
    <xsd:annotation>
        <xsd:documentation>threshold attribute domain is 0,1 or 2</xsd:documentation>
    </xsd:annotation>

```

```
<xsd:complexType>
  <xsd:attribute name="value" type="xsd:string" />
  <xsd:attribute name="unit" type="xsd:string" />
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="threshold_value" type="xsd:string" />
  <xsd:attribute name="threshold" type="xsd:string" />
</xsd:complexType>
</xsd:element>
</xsd:all>
</xsd:complexType>
</xsd:schema>
```

VDS_IOW-IN-ASSETS-CORE_1.7.XSD

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
/*
* Licensed Materials - Property of IBM
*
* 5725-D69
*
* © Copyright International Business Machines Corporation 2015.
*
* For IBM Corporation provided versions, releases and modifications: US Government Users
* Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
* with IBM Corporation.
*/

V1.8
-->
<xsd:schema targetNamespace="http://vds.com/assetTypes"
  xmlns:asset="http://vds.com/assetTypes"
  xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="modelrefType">
    <xsd:annotation>
      <xsd:documentation>modelref will refer to the ID of the semantic
        model for a multi tenant environment.
        If the id attribute of modelref
        is empty all the request will
        executed played against the default
        model. </xsd:documentation>
    </xsd:annotation>
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" name="request" type="asset:requestType" />
    </xsd:sequence>
    <xsd:attribute name="id" type="xsd:string" />
  </xsd:complexType>
  <xsd:complexType name="relationType">

```

```

<xsd:attribute name="relationName" type="xsd:string" />
<xsd:attribute name="targetExtWorkEquipmentType" type="xsd:string" />
<xsd:attribute name="targetExtWorkEquipmentId" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="relationsType">
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" minOccurs="1" name="relation" type="asset:relationType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="thresholdType">
  <xsd:attribute name="range" type="xsd:string" />
  <xsd:attribute name="level" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="3" name="threshold" type="asset:thresholdType" />
  </xsd:sequence>
  <xsd:attribute name="unit" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />
  <xsd:attribute name="measureLabel" type="xsd:string" />
  <xsd:attribute name="isPrimaryMeasurement" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypesType">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="unbounded" name="measureType"
      type="asset:measureTypeType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="attributeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="1" name="value" type="xsd:string" />
    <xsd:element minOccurs="0" maxOccurs="1" name="unit" type="xsd:string" />
  </xsd:sequence>
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />
</xsd:complexType>

```



```

<xsd:complexType name="assetType">
  <xsd:sequence>
    <xsd:element minOccurs="1" maxOccurs="1" name="internalLocation" type="xsd:string" />
    <xsd:element minOccurs="0" maxOccurs="1" name="relations" type="asset:relationsType" />
    <xsd:element minOccurs="0" maxOccurs="unbounded" name="attribute" type="asset:attributeType" />
    <xsd:element minOccurs="0" maxOccurs="1" name="measureTypes" type="asset:measureTypesType" />
  </xsd:sequence>
  <xsd:attribute name="extWorkEquipmentType" type="xsd:string" />
  <xsd:attribute name="extWorkEquipmentId" type="xsd:string" />
  <xsd:attribute name="assetLabel" type="xsd:string" />
  <xsd:attribute name="assetDescription" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="requestType">
  <xsd:annotation>
    <xsd:documentation>request is the actual operation that will be
      executed. It captures the following informations :
      request type :
      CREATE / UPDATE / DELETE
      - Assets data (
      attributes, relations etc
      ...)

      the request type must be one of
      the following :
      - INSERT : create an asset.
      - DELETE : delete an asset.
      - UPDATE : update an asset
    </xsd:documentation>
  </xsd:annotation>
  <xsd:sequence>
    <xsd:element maxOccurs="unbounded" name="asset" type="asset:assetType" />
  </xsd:sequence>
  <xsd:attribute name="type" type="xsd:string" />
</xsd:complexType>
<xsd:element name="operation">
  <xsd:annotation>

```

<xsd:documentation>operation is the root element of the xml file.

It will contain all the requests.

timestamp : xml file generation date.

</xsd:documentation>

</xsd:annotation>

<xsd:complexType>

<xsd:sequence>

<xsd:element maxOccurs="unbounded" name="modelref" type="asset:modelrefType" />

</xsd:sequence>

<xsd:attribute name="timestamp" type="xsd:string" />

</xsd:complexType>

</xsd:element>

</xsd:schema>

VDS_IOW-IN-READINGS-CORE_1.7.XSD

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
/*
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* For IBM Corporation provided versions, releases and modifications: US Government Users
* Restricted Rights - Use, duplication or disclosure restricted by GSA ADP Schedule Contract
* with IBM Corporation.
*/

V1.8
-->
<xsd:schema targetNamespace="http://vds.com/readingsTypes"
  xmlns:readings="http://vds.com/readingsTypes" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="readingValueType">
    <xsd:attribute name="value" type="xsd:string" />
    <xsd:attribute name="unit" type="xsd:string" />
    <xsd:attribute name="type" type="xsd:string" />
  </xsd:complexType>
  <xsd:complexType name="readingValuesType">
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" name="readingValue" type="readings:readingValueType" />
    </xsd:sequence>
  </xsd:complexType>
  <xsd:complexType name="workEquipmentType">
    <xsd:sequence>
      <xsd:element maxOccurs="1" minOccurs="0" name="description" type="xsd:string" />
      <xsd:element minOccurs="0" maxOccurs="unbounded" name="relations"
        type="readings:relationsType" />
    </xsd:sequence>
  </xsd:complexType>
</xsd:schema>

```

```

<xsd:element minOccurs="0" maxOccurs="unbounded" name="attributes"
                type="readings:attributesType" />
<xsd:element minOccurs="0" maxOccurs="1" name="measureTypes"
                type="readings:measureTypesType" />
</xsd:sequence>
<xsd:attribute name="location" type="xsd:string" />
<xsd:attribute name="extType" type="xsd:string" />
<xsd:attribute name="extId" type="xsd:string" />
<xsd:attribute name="modelRef" type="xsd:string" />
<xsd:attribute name="assetLabel" type="xsd:string" />
<xsd:attribute name="assetDescription" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="readingSetType">
  <xsd:sequence>
    <xsd:element name="workEquipment" type="readings:workEquipmentType" />
    <xsd:element name="readingValues" type="readings:readingValuesType" />
  </xsd:sequence>
  <xsd:attribute name="extReadingSetid" type="xsd:string" />
  <xsd:attribute name="timestamp" type="xsd:string" />
  <xsd:attribute name="extRelatedEvtId" type="xsd:string" />
  <xsd:attribute name="extRelatedEvtType" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="attributeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="1" name="value" type="xsd:string" />
    <xsd:element minOccurs="0" maxOccurs="1" name="unit" type="xsd:string" />
  </xsd:sequence>
  <xsd:attribute name="type" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="attributesType">
  <xsd:sequence>
    <xsd:element name="attribute" type="readings:attributeType" />
  </xsd:sequence>
</xsd:complexType>

```

```

<xsd:complexType name="relationType">
  <xsd:attribute name="targetExtWorkEquipmentType" type="xsd:string" />
  <xsd:attribute name="targetExtWorkEquipmentId" type="xsd:string" />
  <xsd:attribute name="type" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="relationsType">
  <xsd:sequence>
    <xsd:element name="relation" type="readings:relationType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:complexType name="thresholdType">
  <xsd:attribute name="range" type="xsd:string" />
  <xsd:attribute name="level" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypeType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="3" name="threshold"
      type="readings:thresholdType" />
  </xsd:sequence>
  <xsd:attribute name="unit" type="xsd:string" />
  <xsd:attribute name="name" type="xsd:string" />
  <xsd:attribute name="isPrimaryMeasurement" type="xsd:string" />
</xsd:complexType>
<xsd:complexType name="measureTypesType">
  <xsd:sequence>
    <xsd:element minOccurs="0" maxOccurs="unbounded" name="measureType"
      type="readings:measureTypeType" />
  </xsd:sequence>
</xsd:complexType>
<xsd:element name="readings">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element maxOccurs="unbounded" name="readingSet" type="readings:readingSetType" />
    </xsd:sequence>
  </xsd:complexType>
</xsd:element>
</xsd:schema>

```

VDS_IOW-IN-WO-CORE_1.7.XSD

```

<?xml version="1.0" encoding="UTF-8"?>
<!--
#
# Licensed Materials - Property of Veolia Environment-VE
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# (C) Copyright Veolia Environment-VE.
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# Users Restricted Rights - Use, duplication or
# disclosure restricted by Contract with Veolia Environment-VE
#
-->
<xsd:schema targetNamespace="http://vds.com/workOrdersType"
  xmlns:wo="http://vds.com/workOrdersType" xmlns:xsd="http://www.w3.org/2001/XMLSchema"
  elementFormDefault="qualified">
  <xsd:complexType name="requestType">
    <xsd:sequence>
      <xsd:element minOccurs="1" maxOccurs="unbounded" name="workorder">
        <xsd:complexType>
          <xsd:all>
            <xsd:element minOccurs="0" maxOccurs="1" name="DATASOURCEID" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="RECORDID" type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="WOEXTID" type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="MODEL_ID" type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="SUBJECT" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="DESCRIPTION" type="xsd:string" />
            <xsd:element minOccurs="1" maxOccurs="1" name="DOMAIN" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="CATEGORY" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="WORKORDERTYPE" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="WORKTYPE" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="SUBTYPE" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="FAILURE" type="xsd:string" />
            <xsd:element minOccurs="0" maxOccurs="1" name="PRIORITY" type="xsd:string" />
          </xsd:all>
        </xsd:complexType>
      </xsd:element>
    </xsd:sequence>
  </xsd:complexType>
</xsd:schema>

```

```

<xsd:element minOccurs="1" maxOccurs="1" name="STATUS" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="JOBPLAN" type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="CREATIONDATE" type="xsd:dateTime" />
<xsd:element minOccurs="1" maxOccurs="1" name="CREATIONTYPE" type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="CREATEDBY" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="TARGETSTARTDATE" type="xsd:dateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="TARGETENDDATE" type="xsd:dateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ACTSTARTDATE" type="xsd:dateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ACTENDDATE" type="xsd:dateTime" />
<xsd:element minOccurs="1" maxOccurs="1" name="LASTUPDATEDTS" type="xsd:dateTime" />
<xsd:element minOccurs="0" maxOccurs="1" name="ZONE" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCATION" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="EXTWORKEQUIPMENTID" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1"
            name="EXTWORKEQUIPMENTTYPE" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="UPDATEDBY" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LEAD" type="xsd:string" />
<xsd:element minOccurs="1" maxOccurs="1" name="NETWORK" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="ADDRESS" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="PERFORMEDBY"
            type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCOWNERID" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCOWNERDETAILS" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="LOCCONTACTID" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1"
            name="LOCCONTACTDETAILS" type="xsd:string" />
<xsd:element minOccurs="0" maxOccurs="1" name="REPORT" type="xsd:string" />
<xsd:element name="SRCEVENTLIST" type="wo:srcEventListType"
            maxOccurs="1" minOccurs="0">

</xsd:element>
</xsd:all>
</xsd:complexType>
</xsd:element>
</xsd:sequence>

```

```

<xsd:attribute name="type" type="xsd:string" />
</xsd:complexType>
<xsd:element name="operations">
  <xsd:complexType>
    <xsd:sequence>
      <xsd:element minOccurs="1" maxOccurs="unbounded" name="request" type="wo:requestType">
        </xsd:element>
      </xsd:sequence>
    </xsd:complexType>
  </xsd:element>

<xsd:complexType name="srcEventType">
  <xsd:all>
    <xsd:element name="SRCEVTCATEGORY" maxOccurs="1" minOccurs="1" type="xsd:string">
      </xsd:element>

    <xsd:element name="SRCEVTTYPE" type="xsd:string" maxOccurs="1" minOccurs="1">
      <xsd:annotation>
        <xsd:documentation>
          For a SRCEVTCATEGORY = ALERT or EVENT, this is
          the IOW EVENTTYPE For a SRCEVTCATEGORY =
          WORKORDER, this is the IOW
          WORKORDER DOMAIN For a SRCEVTCATEGORY = NOREADING or
          READINGTHRESHOLD, this is the IOW MEASUREMENTTYPE
        </xsd:documentation>
      </xsd:annotation>
    </xsd:element>

    <xsd:element name="SRCEVTID" type="xsd:string" maxOccurs="1" minOccurs="0">
      <xsd:annotation>
        <xsd:documentation>
          For a SRCEVTCATEGORY = ALERT or EVENT, this is
          the IOW EXTEVENTID For a SRCEVTCATEGORY = WORKORDER, this is the
          IOW WOEXTID For a SRCEVTCATEGORY = NOREADING or READINGTHRESHOLD,
          this is the IOW MEASUREMENT_ID (only for WO OUT)
        </xsd:documentation>
      </xsd:annotation>
    </xsd:element>
  </xsd:all>
</xsd:complexType>

```



```

    </xsd:documentation>
  </xsd:annotation>
</xsd:element>
<xsd:element name="SRCEVTDATE" type="xsd:dateTime" maxOccurs="1" minOccurs="1">
</xsd:element>
<xsd:element name="SRCEVTORIGVALUE" type="xsd:string" maxOccurs="1" minOccurs="0">
</xsd:element>
<xsd:element name="SRCEVTCURRVALUE" type="xsd:string" maxOccurs="1" minOccurs="0">
</xsd:element>

<xsd:element name="SRCEVTCURRVALUESETS" type="xsd:dateTime"
      maxOccurs="1" minOccurs="0"> </xsd:element>
<xsd:element name="SRCEVTCOMMENT" type="xsd:string"
      maxOccurs="1" minOccurs="0"> </xsd:element>
<xsd:element name="SOPREFERENCE" type="xsd:string"
      maxOccurs="1" minOccurs="0"> </xsd:element>
</xsd:all>
</xsd:complexType>
<xsd:complexType name="srcEventListType">
  <xsd:sequence>
    <xsd:element name="SRCEVENT" type="wo:srcEventType"
      maxOccurs="unbounded" minOccurs="0"> </xsd:element>
  </xsd:sequence>
</xsd:complexType>
</xsd:schema>

```

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