

Sample Mapping #	Mapping Type	Topics/Substitutions	API	Template-Source	Target-Payload	Expected Result
01	JSON	<pre> mappingTopic: /plant1/+/+ mappingTopicSample: /plant1/line1/device1_measure1_Type check: Create non existing device sub: 1.[* _TOPIC_LEVEL_[0]&" "&_TOPIC_LEVEL_[1]&" "&\$substringBefore(_TOPIC_LEVEL_[2],"_") -> source.id] 2.[\$substringAfter(_TOPIC_LEVEL_[2],"_") -> type] 3.[\$now() -> time] 4.[value -> measure1_Type.V.value] </pre>	M	<pre> { "value": 100 } </pre>	<pre> { "measure1_Type": { "v": { "value": 110, "unit": "C" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_TemperatureMeasurement" } </pre>	For the device with external id: plant1_line1_device1 a measurement c8y_TemperatureMeasurement should be created. The device is created implicitly.
02	JSON	<pre> mappingTopic: devices/+ mappingTopicSample: devices/device_best_01 check: Create non existing device sub: 1.[* _TOPIC_LEVEL_[1] -> source.id] 2.[mea[0].values[0].value -> c8y_ProcessLoadMeasurement.L.value] 3.[\$map(\$map(mea.values[0].timestamp, \$number), function(\$v, \$i, \$a) { \$fromMillis(\$v) }) -> time] </pre>	M	<pre> { "mea": [{ "tid": "uuid_01", "psid": "Crest", "devicePath": "path01_80_X03_VVB001StatusB_Crest", "values": [{ "value": 4.6, "timestamp": 1648562285347 }] }, { "tid": "uuid_02", "psid": "Crest", "devicePath": "path01_80_X03_VVB001StatusB_Crest", "values": [{ "value": 5.6, "timestamp": 1648563285347 }] }] } </pre>	<pre> { "c8y_ProcessLoadMeasurement": { "L": { "value": 110, "unit": "%" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_ProcessLoadMeasurement" } </pre>	For the device with external id: device_best_01 multiple measurements should be created. The device is created implicitly.
03	JSON	<pre> mappingTopic: device/express/+ mappingTopicSample: device/express/berlin_01 check: Map device identifier sub: 1.[* _TOPIC_LEVEL_[2] -> id] 2.[customType -> type] 3.[operator&"-"&line -> name] 4.[capacity -> capacity] </pre>	I	<pre> { "line": "Bus-Berlin-Rom", "operator": "EuroBus", "customFragment": { "customFragmentValue": "Express" }, "capacity": 64, "customArray": ["ArrayValue1", "ArrayValue2"], "customType": "type_International" } </pre>	<pre> { "c8y_IsDevice": {}, "com_cumulocity_model_Agent": {}, "name": "Bus Name", "type": "type_bus", "capacity": 100, "id": "909090" } </pre>	Create device with: 1. External id: berlin_01 2. Name: EuroBus-Bus-Berlin-Rom 3. Type: type_International
04	JSON	<pre> mappingTopic: event/+ mappingTopicSample: event/berlin_01 check: Map device identifier sub: 1.[* _TOPIC_LEVEL_[1] -> source.id] 2.[txt->text] 3.[msg_type -> type] 4.[\$now() -> time] </pre>	E	<pre> { "msg_type": "c8y_BusStopEvent", "txt": "Bus stopped at petrol station today!", "td": "2022-09-08T16:21:53.389+02:00", "ts": "1665473038000" } </pre>	<pre> { "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_GeneralBusEvent" } </pre>	Event for existing device should be created mention [\$fromMillis(\$number(deviceTimestamp))>time]

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05	JSON	mappingTopic: measurement/+gazoline mappingTopicSample: measurement/berlin_01/gazoline check: Map device identifier sub: 1.[* _TOPIC_LEVEL [1] -> source.id] 2.[fuel -> c8y_FuelMeasurement.F.value] 3.[\$now() -> time]	M	{ "fuel": 65, "ts": "2022-08-05T00:14:49.389+02:00", "mea": "c8y_FuelMeasurement" }	{ "c8y_FuelMeasurement": { "L": { "value": 110, "unit": "L" } }, "time": "2022-10-18T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_FuelMeasurement" }	Add c8y_FuelMeasurement to bus.
06	JSON	mappingTopic: multiarray/devices mappingTopicSample: multiarray/devices check: Map device identifier sub: 1.[* device -> id] , choose option "Expand Array" 2.[types.type_A -> type] 3.[\$map(used_name, function(\$v, \$i, \$a) { \$contains(\$v,'dl') ? \$join(['Special_i0', \$string(\$i)]) : \$join([\$string(\$v), \$string(\$i)]) }) -> name] , choose option "Expand Array"	I	{ "device": ["dl_id", "d2_id"], "types": { "type_A": "type_A", "type_B": "type_B" }, "used_name": ["Pressure_d1", "Pressure_d2"] }	{ "c8y_IsDevice": {}, "name": "Vibration Sensor", "type": "maker_Vibration_Sensor", "id": "909090" }	New Devices: 1.Pressure_d21 2.Special_i00 should be created. All device have the same type "type_A"
07	JSON	mappingTopic: arrayType/devices mappingTopicSample: arrayType/devices check: Create non existing device sub: 1. [\$substringBefore(\$[0].devicePath,"_AL") -> source.id] 2. [\$[.values[0].value -> c8y_TemperatureMeasurement.T.value] , choose option "Expand Array" 3. [\$map(\$map(\$[.values[0].timestamp, \$number), function(\$v) { \$fromMillis(\$v)}) -> time] , choose option "Expand Array"	M	[{ "tid": "5e4bac9f-b47a-499e-8601-68fc16a9847c", "psid": "Crest", "devicePath": "c2818e07-4c09-42f0-ba24-ddb712573ab5_AL1352_192168221_80_X03_VVB001StatusB_Crest", "processDataUnit": "20", "values": [{ "value": 4.6, "timestamp": 1648562285347 }] }, { "tid": "5e4bac9f-b47a-499e-8601-68fc16a9847c", "psid": "Crest", "devicePath": "c2818e07-4c09-42f0-ba24-ddb712573ab5_AL1352_192168221_80_X03_VVB001StatusB_Crest", "processDataUnit": "20", "values": [{ "value": 5.6, "timestamp": 1648562285347 }] }]	{ "c8y_TemperatureMeasurement": { "T": { "value": 110, "unit": "C" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_TemperatureMeasurement" }	Create one device implicitly with the name: device_c8y_Serial_c2818e07-4c09-42f0-ba24-ddb712573ab5 and for this device create two measurements of type: "c8y_TemperatureMeasurement"

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08	JSON	mappingTopic: eventObject/+ mappingTopicSample: eventObject/berlin_01 sub: 1. [_TOPIC_LEVEL [1] -> source.id] 2. [txt -> text] 3. [msg_type -> type] 4. [\$now() -> time] 5. [model -> customProperties] choose Repair Strategy: REMOVE_IF_MISSING	E	{ "msg_type": "c8y_BusStopEvent", "txt": "Bus stopped at petrol station today!", "td": "2022-09-08T16:21:53.389+02:00", "model": { "name": "MAN e-Bus" } }	{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent", "customProperties": "dummy" }	Create event for device
09	JSON	mappingTopic: measurementObject/+gazoline mappingTopicSample: measurementObject/berlin_01/gazoline sub: 1.[* _TOPIC_LEVEL [1] -> source.id] 2.[mea -> type] 3.[\$now() -> time] 4.[fuel*3.78541 -> c8y_FuelMeasurement.Tank.value] 5.[(oil?{"Motor": {"value":oil, \unit\":"l"}):null) -> c8y_OilMeasurement] choose Repair Strategy: REMOVE_IF_NULL	M	{ "fuel": 65, "oil": 4.5, "ts": "2022-08-05T00:14:49.389+02:00", "mea": "c8y_FuelMeasurement" } 	{ "c8y_FuelMeasurement": { "Tank": { "value": 110, "unit": "l" } }, "c8y_OilMeasurement": "undefined", "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_FuelMeasurement" }	This mapping makes use of the option "REMOVE_IF_MISSING". The incoming payload can contain either properties: "fuel", "oil" or both. Depending on this the relevant fragments in the Cumulocity measurement are created.
13	GENERIC_BINARY	mappingTopic: binary/+ mappingTopicSample: binary/berlin_01 check: Map device identifier sub: 1.[* _TOPIC_LEVEL [1] -> deviceId] 2.[\$number(\$substring(message,0,6)) -> value]	E	Hex Code: 0x41b1 No leading 0x, only the plain payload as hexadecimal numbers	{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent", "value": 99 }	Snoop recorded message
14	JSON	mappingTopic: operation/+ mappingTopicSample: operation/berlin_01 sub: 1.[* _TOPIC_LEVEL [1] -> deviceId] 2.[\$join([text,"_", \$now()]) -> description]	O	{ "text": "Special operation restart" } 	{ "deviceId": "909090", "description": "New camera operation!", "type": "maintenance_operation" }	Create operation "maintenance_operation" for device with externalId berlin_01
15	GENERIC_BINARY	mappingTopic: binaryEvent/+ mappingTopicSample: binaryEvent/berlin_01 sub: 1. ["Temp: "&\$number(\$substring(message,0,4))&" C" -> text] 2. [* _TOPIC_LEVEL [1] -> deviceId] 3. [\$now() -> time]	E	Hex Code: 0x5a75 No leading 0x, only the plain payload as hexadecimal numbers	{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent" }	Send c8y_TestEvent to device with externalId berlin_01
17	JSON	mappingTopic: device/update/+ mappingTopicSample: device/update/berlin_01 sub: 1.[* _TOPIC_LEVEL [2] -> id] 2.[customType->type]	I	{ "customType": "type_Overnight" } 	{ "id" : "909090", "type": "type_any" }	Update type of existing device.

Sample Mapping #	Mapping Type	Topics/Substitutions	API	Template-Source	Target-Payload	Expected Result
18	PROTOBUF_STATIC	mappingTopic: protobuf/measurement mappingTopicSample: protobuf/measurement sub: Defined in cumulocity-dynamic-mapper/dynamic-mapping-service/src/main/java/dynamic/mapping/processor/processor/fixed/StaticProtobufProcessor.java	M	Send message in protobuf format: <pre>option java_package = "mqtt.mapping.processor.protobuf"; option java_outer_classname = "MeasurementProto"; message CustomMeasurement { int64 timestamp = 1; float value = 2; string unit = 3; string externalIdType = 4; string externalId = 5; string measurementType = 6; }</pre> Use test client: cumulocity-dynamic-mapper/dynamic-mapping-service/src/test/java/dynamic/mapping/ProtobufMqttClient.java	<pre>{ "c8y_GenericMeasurement": { "Module": { "value": 110, "unit": "1" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_GenericMeasurement_type" }</pre>	Use test client: cumulocity-dynamic-mapper/dynamic-mapping-service/src/test/java/dynamic/mapping/ProtobufMqttClient.java to create a new measurement for bus "berlin_01"
19	PROCESSOR_EXTENSION	mappingTopic: protobuf/event mappingTopicSample: protobuf/event sub: Defined in cumulocity-dynamic-mapper/dynamic-mapping-extension/src/main/java/dynamic/mapping/processor/extension/external/ProcessorExtensionCustomEvent.java In selection: Extensions for PROCESSOR_EXTENSION choose: dynamic-mapping-extension In selection: Events for dynamic-mapping-extension choose: CustomEvent	E	Send message in protobuf format: <pre>syntax = "proto3"; package processor.protobuf; option java_package = "mqtt.mapping.processor.extension.external"; option java_outer_classname = "CustomEventOuter"; message CustomEvent { int64 timestamp = 1; string txt = 2; string unit = 3; string externalIdType = 4; string externalId = 5; string eventType = 6; }</pre> Use test client: cumulocity-dynamic-mapper/dynamic-mapping-extension/src/test/java/dynamic/mapping/ProtobufMqttClient.java	<pre>{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent" }</pre>	Use test client: cumulocity-dynamic-mapper/mqtt-mapping-extension/src/test/java/dynamic/mapping/ProtobufMqttClient.java to create a new event for bus "berlin_01"
20	JSON	mappingTopic: panel mappingTopicSample: panel check: Create non existing device sub: 1.[* deviceId->source.id] 2.[\$fromMillis(\$number(deviceTimestamp))> time] 3.[temperature->c8y_TemperatureMeasurement.T.value]	I.M	<pre>{ "deviceId": "863859042393327", "version": "1", "deviceType": "20", "deviceTimestamp": "1665473038000", "deviceStatus": "BTR", "temperature": 90 }</pre>	<pre>{ "c8y_TemperatureMeasurement": { "T": { "value": 110, "unit": "C" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_TemperatureMeasurement" }</pre>	Devices with external id: 863859042393327 does not exist and is implicitly created. For this device an new measurement is created.
21	JSON	mappingTopic: panel mappingTopicSample: panel sub: 1.[deviceId->source.id] 2.[[\$now()->time]] 3.['New device status: ' & deviceStatus & '!' -> text]	E	<pre>{ "deviceId": "863859042393327", "version": "1", "deviceType": "20", "deviceTimestamp": "1665473038000", "deviceStatus": "BTR", "temperature": 90 }</pre>	<pre>{ "source": { "id": "909090" }, "text": "New device status: BTR!", "time": "2022-11-24T00:14:49.389+02:00", "type": "c8y_GeneralPanelEvent" }</pre>	For this device an new event is created.

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23	JSON	<pre> mappingTopic: flexM/+gazoline mappingTopicSample: flexM/berlin_01/gazoline sub: 1.[deviceId->source.id] 2.[Measurementname & " _type" -> type] 3.[Measurementname = "Airsensor" ? {Seriesname:{ "value": value, "unit": unit}} : null -> Airsensor]] select: Repair Strategy: REMOVE_IF_NULL 4. [Measurementname = "Liquidsensor" ? {Seriesname:{ "value": value, "unit": unit}} : null -> Liquidsensor] select: Repair Strategy: REMOVE_IF_NULL 5. [\$now() -> time] </pre>	M	<pre> { "Measurementname": "Airsensor", "Seriesname": "Humidity", "value": 10, "unit": "%" } </pre>	<pre> { "Airsensor": "dummy", "Liquidsensor": "dummy", "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_measurementtype" } </pre>	Depending on the content in the payload: 1. is "Airsensor" present 2. is "Liquidsensor" present either mapping 3. or 4. is evaluated and the relevant fragment in the measurement is crrested.
24	JSON	<pre> mappingTopic: alarm/tires mappingTopicSample: alarm/tires sub: 1.[bus_id->source.id] 2.[msg_type->type] 3.[tx->text] </pre>	A	<pre> { "msg_type": "c8y_FlatTireAlarm", "tx": "Left rear tire loses air!", "bus_id": "berlin_01" } </pre>	<pre> { "source": { "id": "909090" }, "type": "c8y_FlatTireAlarm", "text": "Left rear tire loses air!", "severity": "MAJOR", "status": "ACTIVE", "time": "2022-03-19T12:03:27.845Z" } </pre>	An alarm should be created for the device berlin_01.
25	PROCESSOR EXTENSION	<pre> mappingTopic: measurementExt mappingTopicSample: measurementExt sub: Events for mqtt-mapping-extension: CustomMeasurement Extension for PROCESSOR_EXTENSION: mqtt-mapping- extersion Defined in cumulocity-dynamic-mapper/dynamic-mapping- extension/src/main/java/dynamic/mapping/processor/extension/external/ProcessorExtensionCustomMeasurement.java </pre>	M	<pre> { "temperature": 120.5, "unit": "Celsius", "time": "2023-07-12T16:21:53.389+02:00", "externalId": "berlin_01", "unexpected": 17.5 } </pre>	<pre> { "source": { "id": "909090" }, "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_Temperature", "c8y_Temperature": "dummy", "c8y_Fragment_to_remove": "remove_me" } </pre>	A measasement should be created for the device berlin_01. The fragment "c8y_Fragment_to_remove" is not included in the created measurement, as the repair strategy is "REMOVE_IF_NULL". In addition the reapar strategy "CREATE_IF_MISSING" is used. This is required to map the node "unexpected" to the target fragment "c8y_Unexpected". This is created, due to the used reapiir strategy.
26	JSON	<pre> mappingTopic: v2/things/+ mappingTopicSample: v2/things/berlin_01 1. [*_TOPIC_LEVEL_[2] -> source.id] 2. [\$now() -> time] 3. [values[key: {'Measurement': {'value':value, 'key': 'U'}}] -> \$] </pre>	M	<pre> { "values": [{ "key": "velocidad_cabecal", "value": 136.34 }, { "key": "temperature", "value": 25 }] } </pre>	<pre> { "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_FlexibleMeasurement" } </pre>	A measurement with two fragments: 1. velocidad_cabecal 2. temperature is created. It demonstrates the use of a substitution using "\$" as a target. This results in merging the extracted content with the predefined target template.
27	JSON	<pre> mappingTopic: v3/things/+ mappingTopicSample: v3/things/berlin_01 1. [*_TOPIC_LEVEL_[2] -> source.id] 2. [\$now() -> time] 3. [\$map(values, function (\$v) { {\$v.key: {'Measurement': {'value':\$v.value, 'unit': 'U'}}}}) -> \$ }] check: expand2Array </pre>	M	<pre> { "values": [{ "key": "velocidad_cabecal", "value": 136.34 }, { "key": "temperature", "value": 25 }] } </pre>	<pre> { "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_FlexibleMeasurement" } </pre>	Two measurements with different fragments: 1. velocidad_cabecal 2. temperature are created. It demonstrates the use of a substitution using "\$" as a target. This results in merging the extracted content with the predefined target template in combination with the attribute "expand2Array". See as well mapping 26.

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28	JSON	mappingTopic: datalogger/0018 mappingTopicSample: datalogger/0018 1. [* ID -> source.id] 2. [\$replace(ts,' ','T') -> time] 3. [\$map(\$spread(meas), function(\$v, \$k) { { \$keys(\$v): { "value": \$lookup(\$v,\$keys(\$v))[0], "unit": "l/h" } } })~>\$merge() -> onguardMeasurement]	M	{ "ID": "0018", "meas": { "Product1_Flow": [14.93], "Water_Flow": [18.54], "Product2_Flow": [272.9],], "ts": "2024-06-18 13:20:45.000Z", "timestampUTC": "2024-06-18T13:20:45.000Z", }	{ "onguardMeasurement": null, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "onguardMeasurement" }	Map the structure under meas as fragments in the measurements. The number of keys in meas can vary and must therefore be generated dynamically.
51	JSON OUTBOUND	publishTopic: evt/outbound/# mappingTopicSample: evt/outbound/berlin_01 filterMapping: bus_event NOTE: for outbound mappings no tt (template topic) is defined. check: Map device identifier sub: 1.[source.id -> _TOPIC_LEVEL_[2]] 2.[type -> eventType] 3.[\$now() -> time] 4.[bus_event -> bus_event] 5.[source.id -> deviceId], for option Resolve to externalId	E	{ "source": { "id": "38268445" }, "type": "c8y_BusEvent", "text": "Bus was stopped", "time": "2022-08-05T00:14:49.389+02:00", "bus_event": "stop_event" }	{ "deviceId": "909090", "description": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "eventType": "TestEvent", "bus_event": "stop_event", "_TOPIC_LEVEL_": ["evt", "outbound", "berlin_01"] }	Publish mqtt msg. with event on topic 'evt/outbound/berlin_01' Use following command to create sample event: c8y events create --device "YOUR_DEVICE_ID" --data 'bus_event="stop_event", text="Bus was stopped today!'," type="c8y_BusEvent"
52	JSON OUTBOUND	publishTopic: opp/outbound/# mappingTopicSample: opp/outbound/berlin_01 filterMapping: bus_opp NOTE: for outbound mappings no tt (template topic) is defined. sub: 1. [deviceId -> _TOPIC_LEVEL_[2]] choose: Resolve to externalId 2. [bus_opp -> description] 3. [* deviceId -> c8y_Id]	O	{ "deviceId": "909090", "bus_opp": "New engine restart operation!" }	{ "c8y_Id": "909090", "description": "dummy operation", "type": "bus operation", "_TOPIC_LEVEL_": ["opp", "outbound", "berlin_01"] }	Publish mqtt msg. with operation on topic 'opp/outbound/berlin_01' Use following command to create sample event: c8y operations create --device "YOUR_DEVICE_ID" --data 'bus_opp="New engine restart operation!'" Note: The option "resolve2ExternalId = false" esures that the C8Y internal device id is used in substitution 3.