

Sample Mapping #	Mapping Type	Topics/Substitutions	API	Template-Source	Target-Payload	Expected Result
01	JSON	st: /plant1/# tt: /plant1/+/+ tts: /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]	M	{ "value": 100 }	{ "measure1_Type": { "v": { "value": 110, "unit": "C" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_TemperatureMeasurement" }	For the device with external id: plant1_line1_device1 a measurement c8y_TemperatureMeasurement should be created. The device is created implicitly.
02	JSON	st: devices/# tt: devices/+ tts: 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]	M	{ "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 }] }] }	{ "c8y_ProcessLoadMeasurement": { "L": { "value": 110, "unit": "%" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "id": "909090" }, "type": "c8y_ProcessLoadMeasurement" }	For the device with external id: device_best_01 multiple measurements should be created. The device is created implicitly.
03	JSON	st: device/# tt: device/express/+ tts: device/express/berlin_01 check: Map device identifier sub: 1.[* _TOPIC_LEVEL_[2] -> id] 2.[customType -> type] 3.[operator&"-"&line -> name] 4.[capacity -> capacity]	I	{ "line": "Bus-Berlin-Rom", "operator": "EuroBus", "customFragment": { "customFragmentValue": "Express" }, "capacity": 64, "customArray": ["ArrayValue1", "ArrayValue2"], "customType": "type_International" }	{ "c8y_IsDevice": {}, "com_cumulocity_model_Agent": {}, "name": "Bus Name", "type": "type_bus", "capacity": 100, "id": "909090" }	Create device with: 1.external id: berlin_01 2.name: EuroBus-Bus-Berlin-Rom 3.type: type_International

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04	JSON	st: event/# tt: event/+ tts: event/berlin_01 check: Map device identifier sub: 1.[* _TOPIC_LEVEL_[1] -> source.id] 2.[txt->text] 3.[msg_type -> type] 4.[\$now() -> time]	E	{ "msg_type": "c8y_BusStopEvent", "txt": "Bus stopped at petrol station today!", "td": "2022-09-08T16:21:53.389+02:00", "ts": "1665473038000" }	{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_GeneralBusEvent" }	Event for existing device should be created mention [\$fromMillis(\$number(deviceTimestamp)) -> time]
05	JSON	st: measurement/# tt: measurement/+gazoline tts: 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	st: multiaarray/devices tt: multiaarray/devices tts: multiaarray/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,'d1') ? \$join(['Special_i0', \$string(\$i)]) : \$join([\$string(\$v), \$string(\$i)]) }) -> name] , choose option "Expand Array"	I	{ "device": ["d1_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"

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07	JSON	st: arrayType/devices tt: arrayType/devices tts: 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	<pre>{ { "tid": "5e4bac9f-b47a-499e-8601-68fc16a9847c", "psid": "Crest", "devicePath": "c2818e07-4c09-42f0-ba24- ddb712573ab5_AL1352_192168221_80_X03_VVB001StatusB_Cre st", "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_Cre st", "processDataUnit": "20", "values": [{ "value": 5.6, "timestamp": 1648562285347 }] } }</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>	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"
08	JSON	st: eventObject/# tt: eventObject/+ tts: 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	<pre>{ "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" } }</pre>	<pre>{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent", "customProperties": "dummy" }</pre>	Create event for device
09	JSON	st: measurementObject/# tt: measurementObject/+gazoline tts: 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":""1"}}):null) -> c8y_OilMeasurement] choose Repair Strategy: REMOVE IF NULL	M	<pre>{ "fuel": 65, "oil": 4.5, "ts": "2022-08-05T00:14:49.389+02:00", "mea": "c8y_FuelMeasurement" }</pre>	<pre>{ "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" }</pre>	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 n the Cumulocity measurement are created.
13	GENERIC_BINARY	st: binary/+ tt: binary/+ tts: binary/berlin_01 check: Map device identifier sub: 1.[* _TOPIC_LEVEL_[1] -> deviceId] 2.[\$number(\$substring(message,0,6)) -> value]	E	Hex Code: 0x00000000	<pre>{ "source": { "id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent", "value": 99 }</pre>	Snoop recorded message

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14	JSON	st: operation/# tt: operation/+ tts: 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	st: binaryEvent/+ tt: binaryEvent/+ tts: 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	{ "source": { "deviceId": "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	st: device/update/+ tt: device/update/+ tts: 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.
18	PROTOBUF_STATIC	st: protobuf/measurement tt: protobuf/measurement tts: protobuf/measurement sub: Defined in cumulocity-dynamic-mqtt-mapper/mqtt-mapping-service/src/main/java/mqtt/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-mqtt-mapper/mqtt-mapping-service/src/test/java/mqtt/mapping/ProtobufPahoClient.java	{ "c8y_GenericMeasurement": { "Module": { "value": 110, "unit": "1" }, }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "deviceId": "909090" }, "type": "c8y_GenericMeasurement_type" } 	Use test client: cumulocity-dynamic-mqtt-mapper/mqtt-mapping-service/src/test/java/mqtt/mapping/ProtobufPahoClient.java to create a new measurement for bus "berlin_01"

Sample Mapping #	Mapping Type	Topics/Substitutions	API	Template-Source	Target-Payload	Expected Result
19	PROCESSOR_EXTENSION	st: protobuf/event tt: protobuf/event tts: protobuf/event sub: Defined in cumulocity-dynamic-mqtt-mapper/mqtt-mapping-extension/src/main/java/mqtt/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: 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; } Use test client: cumulocity-dynamic-mqtt-mapper/mqtt-mapping-extension/src/test/java/mqtt/mapping/ProtobufPahoClient.java	{ "source": { "Id": "909090" }, "text": "This is a new test event.", "time": "2022-08-05T00:14:49.389+02:00", "type": "c8y_TestEvent" } 	Use test client: cumulocity-dynamic-mqtt-mapper/mqtt-mapping-extension/src/test/java/mqtt/mapping/ProtobufPahoClient.java to create a new event for bus "berlin_01"
20	JSON	st: panel tt: panel tts: panel check: Create non existing device sub: 1.[* deviceId->source.id] 2.[\$fromMillis(\$number(deviceTimestamp))-> time] 3.[temperature->c8y_TemperatureMeasurement.T.value]	I.M	{ "deviceId": "863859042393327", "version": "1", "deviceType": "20", "deviceTimestamp": "1665473038000", "deviceStatus": "BTR", "temperature": 90 } 	{ "c8y_TemperatureMeasurement": { "T": { "value": 110, "unit": "C" } }, "time": "2022-08-05T00:14:49.389+02:00", "source": { "Id": "909090" }, "type": "c8y_TemperatureMeasurement" } 	Devices with external id: 863859042393327 does not exist and is implicitly created. For this device an new measurement is created.
21	JSON	st: panel tt: panel tts: panel sub: 1.[deviceId->source.id] 2.[[\$now()->time]] 3.['New device status: ' & deviceStatus & '!' -> text]	E	{ "deviceId": "863859042393327", "version": "1", "deviceType": "20", "deviceTimestamp": "1665473038000", "deviceStatus": "BTR", "temperature": 90 } 	{ "source": { "Id": "909090" }, "text": "New device status: BTR!", "time": "2022-11-24T00:14:49.389+02:00", "type": "c8y_GeneralPanelEvent" } 	For this device an new event is created.
23	JSON	st: flexM/# tt: flexM/+gazoline tts: 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]	M	{ "Measurementname": "Airsensor", "Seriesname": "Humidity", "value": 10, "unit": "%" } 	{ "Airsensor": "dummy", "Liquidsensor": "dummy", "time": "2022-08-05T00:14:49.389+02:00", "source": { "Id": "909090" }, "type": "c8y_measurementtype" } 	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 created.

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24	JSON	st: alarm/tires tt: alarm/tires tts: alarm/tires sub: 1.[bus_id->source.id] 2.[msg_type->type] 3.[tx->text]	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	st: measurementExt tt: measurementExt tts: measurementExt sub: Events for mqtt-mapping-extension: CustomMeasurement Extension for PROCESSOR_EXTENSION: mqtt-mapping-externsion Defined in cumulocity-dynamic-mqtt-mapper/mqtt-mapping-extension/src/main/java/mqtt/mapping/processor/extension/external/ProcessorExtensionCustomMeasurement.java	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 reapir strategy.
26	JSON	st: v2/things/# tt: v2/things/+ tts: v2/things/berlin_01 1. [* _TOPIC_LEVEL_[2] -> source.id] 2. [\$now() -> time] 3. [values{key: {'Measurement':{'value':value, 'key': 'U'}}} -> \$]	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	st: v3/things/# tt: v3/things/+ tts: 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	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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51	JSON OUTBOUND	pt: evt/outbound/# tts: evt/outbound/berlin_01 filter outbound: 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	<pre>{ "source": { "id": "38268445" }, "type": "c8y_BusEvent", "text": "Bus was stopped", "time": "2022-08-05T00:14:49.389+02:00", "bus_event": "stop_event" }</pre>	<pre>{ "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"] }</pre>	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	pt: opp/outbound/# tts: opp/outbound/berlin_01 filter outbound: 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	<pre>{ "deviceId": "909090", "bus_opp": "New engine restart operation!" }</pre>	<pre>{ "c8y_Id": "909090", "decription": "dummy operation", "type": "bus_operation", "_TOPIC_LEVEL_": ["opp", "outbound", "berlin_01"] }</pre>	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.