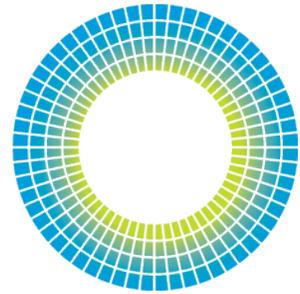


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On-Ramp Total View REST API Guide

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010-0027-00 Rev. B

January 25, 2013

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Revision History

Revision	Release Date	Change Description
A	January 10, 2013	Initial release
B	January 28, 2013	Updated product/application references.

1 Introduction

The On-Ramp Total View Representational State Transfer (REST) API provides an interface to query SDU (Service Data Unit) data from On-Ramp Total View application. The On-Ramp Total View application is considered RESTful because it adheres to the rules of data access and protocol prescribed by REST architecture.

In general, a RESTful application allows machine-to-machine access to web application data via standard HTTP URLs.

NOTE: On-Ramp Wireless is in the process of updating product/application names. During this process, the following names will be used interchangeably within this document:

Former Product Name	New Product Name
ULP	On-Ramp Total Reach
CIMA	On-Ramp Total View

2 Security

2.1 Global Properties

Overall application properties for On-Ramp Wireless REST services are configured via the `cima.config.properties` in the CIMA instance directory. Editing these properties requires SSH (Secure Shell) access.

Table 1. Global Properties

Property	Description	Default
<code>rest.services.enabled</code>	Enables/disables overall service	true
<code>rest.services.thread.interval</code>	Sets the minimum seconds allowed between requests (per user)	0
<code>rest.services.maxresults</code>	Limits the records size for a query	50
<code>rest.services.session.token.life</code>	Sets the number of hours a token is valid for	24
<code>rest.services.session.token.autoextend</code>	This will extend the life of the token each time a user uses the service	true

2.2 Users

Any application that consumes On-Ramp Wireless REST services needs a valid On-Ramp Total View (a.k.a. CIMA) user account with a “Service” role. Users can be added/edited by an Administrator user by navigating within On-Ramp Total View to Config → Users. The User must be assigned the data type in order to query the SDU data for that particular application type.

The screenshot shows a window titled "Edit User" with two tabs: "Profile" and "Security". The "Security" tab is active. Below the tabs, there is instructional text: "To assign a role to the user, drag the role name from 'Available Roles' onto 'Assigned Role' list box. A user with no role is disabled from logging in." Below this, there are two boxes: "Assigned Role" containing "Service" and "Available Roles" containing "Admin", "Guest", "Operator", and "Service". Below that, another instructional text: "To assign data types to a person, drag type names from 'Available Data Types' to 'Assigned Data Types'." Below this, there are two boxes: "Assigned Data Types" containing "FCI-UD: 8301D", "WIYZ: Valve Monitor", "WIYZ: Methane Gas Sensor", and "KONWPT: Gas Pressure Sensor"; and "Available Data Types" containing "Generic Node", "FCI-O: WSO-11", "WIYZ: Methane Gas Sensor", and "WIYZ: Valve Monitor". At the bottom right, there are "Cancel" and "Save" buttons.

Figure 1. Editing User for Service Role

3 Consuming Services

3.1 Retrieving a Token

The application/user is required to receive a session token before querying for SDU data. The token can be acquired by sending an HTTP POST to the server by appending “/rest/login” to the On-Ramp Total View (a.k.a. CIMA) URL.

Example Request

<http://localhost:8081/cima/OnRampGateway/rest/login>

The request must send the following XML body with the POST with the correct username and password.

```
<?xml version="1.0" encoding="UTF-8"?>
<user>
  <username>user</username>
  <password>password </password>
</user>
```

Response

The REST server will return a valid session if the credentials are correct.

Example Response

```
<?xml version="1.0" encoding="UTF-8" standalone="no"?>
<restsession xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <expiration>2012-08-03T18:05:58-07:00</expiration>
  <token>8ab2843b38e8f8cb0138e90f28010002</token>
</restsession>
```

3.2 Retrieving Data Using HTTP GET

SDU data can be retrieved by appending “rest/sdu/<token>/” with optional parameters to the On-Ramp Total View (a.k.a. CIMA) base URL.

3.2.1 Parameters

Parameters are optional and can be appended to the token (followed by “/?”) in any order. Parameters need to be separated by the “&” character.

If the “apptypeid” parameter is not present, then the response will only contain unparsed raw SDU data.

All data includes only uplink data unless the “downlinksdu” parameter is present. If “downlinksdu” is specified, then the response includes only downlink data.

Table 2. Query Parameters

Parameter	Description	Value Type
apptypeid=<value>	Restricts to SDUs that have the same application type ID.	Integer/long
id=<value>	Returns all nodes with an ID greater/equal to <value>.	Integer/long
received=<value>	Returns all nodes that were received greater/equal than the date (epoch long).	Integer/long (milliseconds since epoch)
nodeid=<value>	Restricts to just SDUs belonging to UlpNodeid of <value>.	Integer/long
asc=<value>	Orders results by ascending <value> where <value> is another valid parameter.	String
dsc=<value>	Orders results by descending <value> where <value> is another valid parameter.	String
maxresults=<value>	Restricts results to <value> but this does not override the cima config.properties value for maxresults.	Integer/long
servertime	Returns server's milliseconds since epoch. This will override all other parameters on the URL and will return only the server time.	The difference, measured in milliseconds, between the current time and midnight, January 1, 1970 UTC.
downlinksdu	Returns downlink data instead of uplink data. Compatible with the same parameter arguments as uplink requests.	Not applicable

3.2.2 Query Examples

3.2.2.1 Server Time Query

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2849039c00c3a0139c071cf8e0005?servertime>

```
<ServerTime>
  <milliseconds>1347559157392</milliseconds>
</ServerTime>
```

3.2.2.2 Oldest SDU

Query for the oldest SDU for apptype 1.

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2849039c00c3a0139c071cf8e0005?maxresults=1&apptypeid=1&asc=id&id=0>

3.2.2.3 Most Recent SDU

Last SDU received for apptype 1.

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2849039c00c3a0139c071cf8e0005?maxresults=1&apptypeid=1&dsc=id>

3.2.2.4 List of the Most Recent SDUs

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2849039c00c3a0139c071cf8e0005?maxresults=100&apptypeid=1&dsc=id>

3.2.2.5 Raw SDU Query

A raw SDU with the ID of 5.

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2843b38e8f8cb0138e90f28010002/?id=5&maxresults=1>

3.2.2.6 Application Type SDU Query

Query for a max of 10 SDUs for apptypeid of 12 and database ID \geq 5.

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2843b38e8f8cb0138e90f28010002/?apptypeid=12&id=5&maxresults=10>

3.2.2.7 For Specific ULP Node ID for an Application Type

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab2843b38e8f8cb0138e90f28010002/?apptypeid=12&nodeid=100>

3.2.2.8 Query for Downlink SDU

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab284c63c1b8deb013c1b98d47a0000?downlinksdu>

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab284c63c1b8deb013c1b98d47a0000?downlinksdu&apptypeid=2>

3.3 Sending Data using HTTP POST

Downlink SDU payloads can be sent to the device by using an HTTP POST with a correctly formatted XML body. No URL parameters are needed but a valid token must be included.

3.3.1 URL Example

<http://localhost:8081/cima/OnRampGateway/rest/sdu/8ab284c63c1b8deb013c1b98d47a0000>

3.3.2 XML Body

Tag	Description	Value Type
UlpNodeid	Node ID for device	Decimal
payload	Data to be sent to the device (maximum 464 bytes)	Hexadecimal (no leading 0x)
flush	Flushes existing downlink requests for device	true or false

Downlink SDU Example

```
<?xml version="1.0" encoding="UTF-8"?>
<downlinkrequest>
  <UlpNodeId>510</UlpNodeId>
  <payload>FFAA0110</payload>
  <flush>>false</flush>
</downlinkrequest>
```

3.3.3 Response

The response will include the downlink SDU in a XML body. The status of the request can also be queried as described in section 3.2 Retrieving Data Using HTTP GET.

Example

```
<?xml version="1.0" encoding="UTF-8" standalone="yes"?>
<DownlinkSdu xmlns:xs="http://www.w3.org/2001/XMLSchema"
xmlns:xsi="http://www.w3.org/2001/XMLSchema-instance">
  <App_Device_Id>510</App_Device_Id>
  <dataTypeId>2</dataTypeId>
  <payload>
    <downlinkMessageParams>
      <hex>FFAA0110</hex>
      <name>dl_payload</name>
    </downlinkMessageParams>
  </payload>
  <Message_Id>36</Message_Id>
  <Failures/>
  <Device_Id>1</Device_Id>
  <Message_Received>1357673203000</Message_Received>
  <ackstatus>pending</ackstatus>
  <ULP_Node_Id>510</ULP_Node_Id>
  <MetaAttribs/>
</DownlinkSdu>
```

4 Application XML Payloads

The XML *payload* is the body data or contents (e.g., the “cargo”) of a data transmission as opposed to the *wrapper* which is the boilerplate XML around the content. As such, the payload is the *variable* part of the reply.

This chapter provides one example of a parsed uplink SDU for the KONČAR KONWPT application. The On-Ramp Total View REST API can be used to query SDU data from other applications as well, for example, GridSense TransformerIQ (TIQ), Schweitzer Engineering Laboratories (SEL) Fault Circuit Indicator (FCI), Federal Aviation Administration (FAA) lighting, etc., in addition to raw, unparsed SDUs with hexadecimal content.

4.1 KONWPT (Sample Application)

The KONWPT is the wireless pressure transmitter developed by KONČAR that is part of the wireless pipeline pressure monitoring system. The KONWPT is a battery powered autonomous unit for pipeline pressure measurement. The KONWPT application and its payload information are provided as examples.

4.1.1 Failure Types

Table 3. KONWPT Failure Types

ID	Name
1501	KONWPT_MAX_INACTIVE_EXCEEDED
1502	KONWPT_OVER_THRESHOLD
1503	KONWPT_UNDER_THRESHOLD
1504	KONWPT_RATE_OF_CHANGE
1505	KONWPT_SENSOR_FAULT
1506	KONWPT_LOW_BATTERY

4.1.2 Message Type

Periodic,
GetDeviceSettings,
SetDeviceSettings,
GetDeviceStats,
ResetAlarms

4.1.2.1 Example XML

```
<xmlListWrapper xmlns:xs="http://www.w3.org/2001/XMLSchema" xmlns:xsi="http://  
www.w3.org/2001/XMLSchema-instance">  
  <size>1</size>  
  <element xsi:type="konwptSdu">
```

```
<AppTypeID>21</AppTypeID>
<App_Device_Id>50</App_Device_Id>
<deviceTimestamp>1343993999000</deviceTimestamp>
<Message_Id>1</Message_Id>
<Failures>
  <item>
    <Id>1504</Id>
    <Severity>50</Severity>
    <Time xsi:nil="true"/>
  </item>
  <item>
    <Id>1502</Id>
    <Severity>50</Severity>
    <Time xsi:nil="true"/>
  </item>
</Failures>
<lowBatteryAlarm>false</lowBatteryAlarm>
<messageType>Periodic</messageType>
<Device_Id>104</Device_Id>
<overThresholdAlarm>true</overThresholdAlarm>
<pressure>73.05127964696351</pressure>
<rateOfChangeAlarm>true</rateOfChangeAlarm>
<Message_Received>1344019198000</Message_Received>
<sensorFaultAlarm>false</sensorFaultAlarm>
<timeAcquisitionError>true</timeAcquisitionError>
<ULP_Node_Id>50</ULP_Node_Id>
<underThresholdAlarm>false</underThresholdAlarm>
<voltage>3.0146520146520146</voltage>
<MetaAttribs>
  <Attrib>
    <Name>Description</Name>
    <Value xsi:nil="true"/>
  </Attrib>
  <Attrib>
    <Name>Latitude</Name>
    <Value xsi:nil="true"/>
  </Attrib>
  <Attrib>
    <Name>Longitude</Name>
    <Value xsi:nil="true"/>
  </Attrib>
</MetaAttribs>
</element>
</xmlListWrapper>
```

Appendix A Abbreviations and Terms

Abbreviation/Term	Definition
CIMA	Critical Infrastructure Monitoring Application. The network component that passes data from the Gateway to the associated upstream databases. This product name is transitioning to On-Ramp Total View.
FAA	Federal Aviation Administration
FCI	Fault Circuit Indicator
HTTP	Hypertext Transfer Protocol
HTTP GET	Requests a representation of the specified resource. Requests using GET should only retrieve data and should have no other effect.
HTTP POST	Requests that the server accept the entity enclosed in the request as a new subordinate of the resource identified by the URI. The data POSTed might be, for example: <ul style="list-style-type: none"> ■ An annotation for existing resources ■ A message for a bulletin board, newsgroup, mailing list, or comment thread ■ A block of data that is the result of submitting a web form to a data-handling process ■ An item to add to a database
KONWPT	The wireless pressure transmitter developed by KONČAR that is part of the wireless pipeline pressure monitoring system. The KONWPT is a battery powered autonomous unit for pipeline pressure measurement.
Node	The wireless module developed by On-Ramp Wireless that integrates with OEM sensors and communicates sensor data to an Access Point. Also, the generic term used interchangeably with endpoint device.
On-Ramp Total Reach	The On-Ramp Wireless' proprietary wireless communication technology and network. Formerly known as ULP.
On-Ramp Total View	The network component that passes data from the Gateway to the associated upstream databases. Formerly known as CIMA.
Payload	The XML payload is the body data or contents (e.g., the "cargo") of a data transmission.
REST	Representational State Transfer
SDU	Service Data Unit
SEL	Schweitzer Engineering Laboratories
SSH	Secure Shell
SSL	Secure Socket Layer
TIQ	TransformerIQ
URL	Uniform Resource Locator
XML	Extensible Markup Language