
MultiConnect[®] rCell API

Developer Guide



MultiConnect® rCell API Developer Guide

Models: MTR-H5, MTR-H6, MTR-G3, MTR-EV3, MTR-C2 (Software Version 3.1.4)

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1 Introduction

The MultiConnect® rCell is a cellular router that uses a RESTful JSON API for managing configurations, polling statistics, and issuing commands. This document provides information on the design, patterns, and methods within the rCell API. The Appendix of this document has additional information for those unfamiliar with the REST architecture or JSON data format. For additional examples and use-cases, explore the JavaScript within the rCell website, specifically [https://\[rcell_ip\]/js/api.js](https://[rcell_ip]/js/api.js).

2 Requests

All API requests will be directed to the [https://\[rcell_ip\]/api](https://[rcell_ip]/api) url. The majority of requests follow the same RESTful pattern. Following the api url will be a collection name or a command directive. For example, information on the current DHCP settings can be found in the DHCP collection at [https://\[rcell_ip\]/api/dhcp](https://[rcell_ip]/api/dhcp). A full list of collections and commands can be found in section 4. For all examples in this document, the rCell's IP address is 192.168.2.1.

2.1 Making Requests

The RESTful interface allows users to retrieve data, add data, update data, and delete data using call methods: GET, POST, PUT and DELETE, respectively. These methods can be set in the HTTP header, or they can be set in the URI using the key: **method**. Using the URI parameter **method** is a useful way to execute RESTful requests through a web browser. Additional URI parameters can be found in section 2.9 URI Parameters.

All API requests return a JSON object. The JSON response will always contain the members **code** and **status**. The **status** member indicates a high-level result of the request and has two possible values: *success* and *fail*. The **code** member is an HTTP response code describing the outcome of the API result. For a full list of response code values, see section 3.2.2 Error Codes.

If an API call was successful, it may contain the member: **result**. This member contains data that was either requested or data that was generated as part of the API request. If an API call was unsuccessful, the JSON response will contain the member **error**. This member is a short description of the failure.

Example: Retrieving the current DHCP setting using the **method** URI parameter.

```

1 GET https://192.168.2.1/api/dhcp?method=GET
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : {
7     "defaultGateway" : "192.168.2.1",
8     "domain" : "",
9     "enabled" : true,
10    "fixedAddresses" : [
11      {
12        "ip" : "192.168.2.15",
13        "mac" : "00:1A:12:19:3F:60"
14      }
15    ],
16    "leaseTime" : 86400,
17    "leases" : [
18      {
19        "expiration" : 70359,
20        "hostName" : "my-pc",
21        "ip" : "192.168.2.103",

```

```

22     "mac" : "00:3a:83:10:24:DC"
23   }
24 ],
25 "maxLeases" : 200,
26 "options" : [ "dhcp-authoritative" ],
27 "rangeEnd" : "192.168.2.254",
28 "rangeStart" : "192.168.2.100",
29 "subnetAddress" : "192.168.2.0",
30 "subnetMask" : "255.255.255.0"
31 },
32 "status" : "success"
33 }

```

The API allows requests to path to specific elements or groups of embedded elements. For example, if a user only wanted to know if DHCP was enabled, they could make the request: [https://\[rcell_ip\]/api/dhcp/enabled](https://[rcell_ip]/api/dhcp/enabled).

Example: Path to an element within the DHCP collection.

```

1 GET https://192.168.2.1/api/dhcp/enabled
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : true,
7   "status" : "success"
8 }

```

Accessing objects within an array can be done using the index of the desired object in the path. Some collections support using an object's unique identifier in place of the object's index; generally, this unique identifier is a member called **name** or **guid**. For example, suppose an rCell was configured with a GRE tunnel named *MyGreTunnel*, and a user wanted to know the IP address of the remote end point of that tunnel. The user could make a RESTful GET request to [https://\[rcell_ip\]/api/greTunnels/MyGreTunnel/remotelp](https://[rcell_ip]/api/greTunnels/MyGreTunnel/remotelp).

Example: Path to an element within an object in an array using the object's unique identifier.

```

1 GET https://192.168.2.1/api/greTunnels/MyGreTunnel/remotelp
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : "166.184.38.73",
7   "status" : "success"
8 }

```

2.2 Logging In

To use the API, a user must be authorized and have equal or greater privileges than the API call they are invoking. A user can login with valid credentials by passing their username and password to the login URL (<https://192.168.2.1/api/login>) either as URI parameters or within a JSON object. The following call will login the user *admin*, and return the session information including an authorized token. The API attempts to cache the token as a cookie in the user's web browser for authorizing future calls. As an alternative to using a browser cookie, this token can be passed as a URI parameter using the key: **token**. Additional URI parameters can be found in section 2.9 URI Parameters.

Example: Login using username 'admin' and password 'admin'.

```

1 GET https://192.168.2.1/api/login?username=admin&password=admin
2
3 Status: HTTP/1.1 200 OK

```

```

4 {
5   "code" : 200,
6   "result" : {
7     "address" : "192.168.2.103",
8     "permission" : "admin",
9     "port" : "59486",
10    "timestamp" : "2:58:40:389",
11    "token" : "B7083A0B14C0F0BEFFBED89B99EFBC",
12    "user" : "admin"
13  },
14  "status" : "success"
15 }

```

A token may timeout due to inactivity. The timeout configuration is in the rCell's Remote Access collection (`api/remoteAccess/timeoutSeconds`). There are two authorizers, one for website access and one for non-web browser usage, such as command line utilities like `wget` and `curl`. The same user can not be logged in through the same authorizer from more than one IP address. If a user is already logged in and attempts to login from another IP address, a conflict error will be returned. A user can logout from any IP address with the proper credentials.

2.3 Logging Out

The logout call requires that the caller has equal or greater permissions than the user they are logging out. If a user wants to logout, they can pass their authorized token in the following call:

Example: `https://192.168.2.1/api/logout?token=ABCDEF1234567890ABCDEF12345678`

To logout another user (*guest*), a user with equal or greater permissions can use their token to authorize the call:

Example: `https://192.168.2.1/api/logout?logoutUser=guest&token=ABCDEF1234567890ABCDEF12345678`

Credentials can also be passed with the logout command to authorize the logout call of another user:

Example: `https://192.168.2.1/api/logout?username=admin&password=admin&logoutUser=guest`

2.4 Who Am I

At any point, a user can retrieve their session information using the following API call:

Example:

```

1 GET https://192.168.2.1/api/whoami
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : {
7     "address" : "192.168.2.103",
8     "permission" : "admin",
9     "port" : "59486",
10    "timestamp" : "2:58:40:389",
11    "token" : "B7083A0B14C0F0BEFFBED89B99EFBC",
12    "user" : "admin"
13  },
14  "status" : "success"
15 }

```

2.5 Passing JSON Data

Data can be sent to the rCell by passing a JSON object in the body of the request content or by passing a JSON object in the URI parameter: **data**. As an example, the following request uses a RESTful PUT call to edit the current DHCP configurations by passing in a JSON object with the **enabled** member set to *false*

Example: To disable DHCP, send the following request:

```
https://192.168.2.1/api/dhcp?data={"enabled":false}&method=PUT
```

2.6 Saving Changes

A call to save ([https://\[rcell_ip\]/command/save](https://[rcell_ip]/command/save)) will write current changes to the device settings. Commands are executed using RESTful POST requests. A full list of commands can be found in section 4.1 Commands.

Example: To save the current changes, send a request to:

```
https://192.168.2.1/api/command/save?method=POST
```

2.7 Selecting a Version of an API Call

As the rCell API evolves and new features are added, backwards compatibility can be maintained by setting the desired API version within the request. The API version can be set through the **version** URI parameter, or through the URL path by subscripting the version number with the letter 'v'. If a request has only one version, this value is ignored.

Example: To use version 1 of the API, all API requests would be made through [https://\[rcell_ip\]/api/v1/\[request_path\]](https://[rcell_ip]/api/v1/[request_path]) or [https://\[rcell_ip\]/api/\[request_path\]?version=1](https://[rcell_ip]/api/[request_path]?version=1). If a version is not specified, the request will be executed using the latest API version.

2.8 Element Descriptions

The API provides documentation on collections and elements through [https://\[rcell_ip\]/api/help](https://[rcell_ip]/api/help). For a description of an element or group of elements, use the path to retrieve the data and prepend **help** to the collection component. For example, if a user wanted information on the DHCP element **enabled** ([https://\[rcell_ip\]/api/dhcp/enabled](https://[rcell_ip]/api/dhcp/enabled)), they could submit a RESTful GET request to [https://\[rcell_ip\]/api/help/dhcp/enabled](https://[rcell_ip]/api/help/dhcp/enabled).

Example: Retrieving a description of the DHCP member *enabled*.

```

1 GET https://192.168.2.1/api/help/dhcp/enabled
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : {
7     "dhcp_enabled" : "enable or disable DHCP server (default:true) : BOOL"
8   },
9   "status" : "success"
10 }
```

The API also provides a separate set of help descriptions that are used by the rCell website for context-sensitive help-on-hover content. The path to each description follows the menu and category embedding of the rCell website.

Example: Retrieving a more human-readable description of the DHCP member *enabled*.

```

1 GET https://192.168.2.1/api/help/Setup/DHCP/Settings/Enabled
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : {
7     "Setup_DHCP_Settings_Enabled" : "Check to use a DHCP server on network"
8   },
9   "status" : "success"
10 }

```

2.9 URI Parameters

URI parameters are reserved keys that are used to modify the functionality of API calls, override HTTP header values, and bundle multiple API requests together. Below is a list of available URI keys and descriptions of their functionality.

| URI Key | Description |
|------------|---|
| fields | <p>Applies a RESTful action to multiple collections/elements. Each request path is separated by a comma. Requested data within a field is returned using the path by replacing '/' characters with '_' characters.</p> <p>Example:</p> <pre> 1 GET https://192.168.2.1/api?fields=lan/ip,serial/client/enabled&method=GET 2 3 Status: HTTP/1.1 200 OK 4 { 5 "code" : 200, 6 "result" : { 7 "lan_ip" : "192.168.2.1", 8 "serial_client_enabled" : false 9 }, 10 "status" : "success" 11 } </pre> |
| method | Allows passing RESTful action (GET, PUT, POST, & DELETE) in URI. This overrides the HTTP header method. See section 2.1 |
| apply | Allows the request to be applied at the given timestamp without restarting. Currently, only apply=now is supported. |
| token | Authorized Login Token. This can be passed to authorize an API call. A token is returned upon a successful login. If a user is logged in, the whoami request will return the users current token. See section 2.2 |
| inactivity | Allows requests to be made without bumping the user's token expiration date. This is useful for automated polling loops that still want to allow a user to timeout due to inactivity (inactivity=true) |
| session | Reserved for internal use. This member will be overwritten. |
| data | Allows passing a JSON Object in the URI. |
| default | This option will retrieve the factory defaults of a collection when using a RESTful GET request, and set a collection to its factory defaults when using a RESTful PUT request. (default=true) |
| version | Sets the API version to use during the request. See section 2.7 |
| username | User's login name. Used for logging into the API. See section 2.2 |
| password | User's login password. Used for logging into the API. See section 2.2 |
| logoutUser | User to be logged out. Only used on api/logout request. See section 2.3 |

3 Responses

All API requests return a JSON object. The JSON response will always contain the members **code** and **status**. The **status** member indicates a high-level result of the request and has two possible values: *success* and *fail*. The **code** member is a HTTP response code describing the outcome of the API result. Certain actions or events in the API may result in a URL redirect, such as trying to access API methods when a user is not logged in. In these situations, the JSON response may contain the member **referrer**.

3.1 Success

In the event of a successful request a success message will be returned with the member **status** set to *success* and **code** set to 200. If data is sent in the response it will be found in the **result** field.

3.1.1 Success response format

```
1 Status: HTTP/1.1 200 OK
2 {
3   "code": 200,
4   "status": "success",
5   "result": { [JSON Object or Array] }
6 }
```

3.2 Error

An error response will always contain the members: **code**, **status**, and **error**. If an error is encountered during a request, the API will halt processing and return an error message. This means that a request with multiple errors will receive a response containing error information on only the first error that the API finds during the processing of that request.

3.2.1 Error response format

```
1 Status: HTTP/1.1 [Error Code] [Error Message]
2 {
3   "code": [Error Code],
4   "status": "fail",
5   "error": "[Error Message]"
6 }
```

3.2.2 Error Codes

| Code | Error |
|------|-----------------------|
| 400 | Bad Request |
| 401 | Unauthorized |
| 403 | Forbidden |
| 404 | Not Found |
| 405 | Method Not Allowed |
| 406 | Not Acceptable |
| 408 | Request Timeout |
| 409 | Conflict |
| 500 | Internal Server Error |
| 501 | Not Implemented |

4 Commands and Collections

4.1 Commands

The API supports a set of special actions through the Command URL (`api/command`). To execute a command, the call method must be a POST request. A RESTful GET request will return an array of all of the commands.

| Command | Description | Parameters |
|------------------|---|--------------------|
| firmware_upgrade | Upgrades rCell firmware | upgrade file |
| legacy_sync | Synchronizes legacy configurations | |
| restart | Restarts rCell device | |
| revert | Reverts all changes since the last save | |
| save | Saves the current configurations | |
| ddns_update | Pushes DDNS information to the configured DDNS server | |
| download_config | Downloads the current configurations | |
| loglvl_debug | Sets the API's logging level to DEBUG | |
| loglvl_info | Sets the API's logging level to INFO | |
| loglvl_trace | Sets the API's logging level to TRACE | |
| loglvl_warning | Sets the API's logging level to WARNING | |
| ping | Send a set of ICMP pings to an address or url | JSON Data |
| | <pre> 1 { 2 "ip": [IP Address or URL], 3 "interface": [ANY, LAN, WIFI, CELLULAR, ETHERNET] 4 }</pre> | |
| radio_activate | Attempts to activate the on-board cellular radio (CDMA only) | JSON Data |
| radio_cmd | Send a string directly to the cellular radio | JSON Data |
| | <pre> 1 { 2 "at": [AT COMMAND], 3 "timeout": [milliseconds] 4 }</pre> | |
| remove_icon | Deletes user-supplied icon | |
| remove_image | Deletes user-supplied image | |
| remove_logo | Deletes user-supplied logo | |
| reset_bluetooth | Resets the Bluetooth hardware | |
| reset_modem | Resets the cellular radio hardware | |
| reset_wifi | Resets the WiFi hardware | |
| restore_defaults | Resets the rCell with User-Defined defaults if set, otherwise factory | |
| restore_factory | Resets the rCell with factory defaults | |
| clean_oem | Clears User-Defined default configurations returning factory default | |
| save_oem | Saves current configurations as factory/OEM defaults | |
| save_restart | Saves the current configurations and restarts the rCell | |
| telit_upgrade | Upgrades the Telit radio firmware | upgrade file |
| upload_config | Uploads and sets new configurations | configuration file |
| upload_icon | Uploads and sets new icon | icon file |
| upload_image | Uploads and sets new image | image file |
| upload_logo | Uploads and sets new logo | logo file |

4.2 Collections

Collections are groups of related elements used to configure a service or capability. There are four main actions that can be performed on a collection: get, edit, add, and delete. These actions align with RESTful calls: GET, PUT, POST, and DELETE.

| Collection | Type | Description |
|------------------|--------|--|
| autoDialout | OBJECT | allow use of cellular modem directly from serial port |
| autoReboot | OBJECT | cause the device to automatically reboot |
| backOffTimers | OBJECT | carrier-defined backoff timings for PPP connections, SMS retries, and modem resets |
| bluetooth | OBJECT | allow a device to connect via Bluetooth |
| brand | OBJECT | customize icons, images and support information for rebranded rCell |
| certificate | OBJECT | secure public key certificate configurations |
| command | OBJECT | set of special actions to perform on the device (requires POST request) |
| ddns | OBJECT | dynamic domain name server update remote server when ip address changes |
| devices | ARRAY | list of saved devices |
| dhcp | OBJECT | DHCP settings |
| dns | OBJECT | dns forwarding feature |
| filters | ARRAY | array of firewall filters |
| gcpp | OBJECT | settings for gcpp application |
| gps | OBJECT | gps service settings |
| greTunnels | ARRAY | list of gre tunnels |
| ipPipes | ARRAY | list of configured IP Pipes |
| ipsecTunnels | ARRAY | array of IPsec tunnels |
| lan | OBJECT | lan interface settings |
| legacyDefaults | OBJECT | legacy default settings, do not modify |
| nat | ARRAY | list of NAT rules for advanced firewall settings |
| networks | ARRAY | array of networks to be used in setting filters and tunnels |
| ppp | OBJECT | PPP settings |
| remoteAccess | OBJECT | settings to configure remote access of device |
| remoteManagement | OBJECT | remote management settings |
| routes | ARRAY | list of static routes |
| serial | OBJECT | settings for serial port |
| sms | OBJECT | settings for sms |
| smtp | OBJECT | settings for smtp |
| sntp | OBJECT | settings for clock synchronization between computer systems |
| syslog | OBJECT | settings for syslog support |
| system | OBJECT | system attributes |
| users | ARRAY | users collection for authentication |
| waninfo | OBJECT | information on WAN interfaces |
| wanmgr | OBJECT | settings for WAN management |
| wifi | OBJECT | settings for wi-fi services |

4.3 Collection Details

4.3.1 autoDialout

Description: allow use of cellular modem directly from serial port : OBJECT

| Element | Type | Description |
|----------------------|------|---|
| eia | BOOL | enable or disable EIA standard signal characteristics (default:false) |
| enabled | BOOL | enable or disable this feature (default:true) |
| inactivity | UINT | set inactivity timeout in seconds set to 0 to disable (default:0) |
| login | BOOL | enable or disable login requirement (default:true) |
| port | UINT | configure port to use when connecting to rCell (default:5000) |
| raw | BOOL | enable or disable raw mode (default:false) |
| tcpKeepaliveInterval | UINT | The interval between subsequential keepalive probes, regardless of what the connection has exchanged in the meantime (default:75) |
| tcpKeepaliveProbes | UINT | The number of unacknowledged probes to send before considering the connection dead and notifying the application layer (default:9) |
| tcpKeepaliveTime | UINT | The interval between the last data packet sent (simple ACKs are not considered data) and the first keepalive probe; after the connection is marked to need keepalive, this counter is not used any further (default:7200) |

4.3.2 autoReboot

Description: cause the device to automatically reboot : OBJECT

| Element | Type | Description |
|---------|--------|--|
| hour | UINT | based on the mode as either Hour of Day or Hours from Boot |
| mode | STRING | DISABLED, TIME, or TIMER (default: DISABLED) |

4.3.3 backOffTimers

Description: carrier-defined backoff timings for PPP connections, SMS retries, and modem resets : OBJECT

| Element | Type | Description |
|-------------|--------|---|
| enabled | BOOL | enable or disable backOffTimers feature (default:true) |
| timers | ARRAY | list of BackOff Timers |
| carrierName | STRING | name of carrier |
| data | ARRAY | Data timings, interval between cellular connection attempts in seconds |
| dataReset | ARRAY | Data reset timings, interval between connection reset attempts in seconds |
| modemReset | ARRAY | Modem reset timings, interval between resetting the modem in seconds |
| readOnly | BOOL | read-only |
| sms | ARRAY | Sms timings, interval between attempts to send SMS in seconds |

4.3.4 bluetooth

Description: allow a device to connect via Bluetooth : OBJECT

| Element | Type | Description |
|--------------|--------|---|
| device | OBJECT | bluetooth settings of connected device |
| address | STRING | mac address of bluetooth device |
| name | STRING | name of bluetooth device |
| devices | ARRAY | list of bluetooth devices found during last scan |
| address | STRING | mac address of device |
| name | STRING | label for device |
| enabled | BOOL | enable or disable bluetooth feature (default:false) |
| savedDevices | ARRAY | list of saved bluetooth devices |
| address | STRING | mac address of device |
| friendlyName | STRING | user defined name of device |
| name | STRING | scanned name of device |

4.3.5 brand

Description: customize icons, images and support information for rebranded rCell : OBJECT

| Element | Type | Description |
|-----------------|--------|--|
| address1 | STRING | address of company for support contact |
| address2 | STRING | address of company for support contact |
| city | STRING | city of company for support contact |
| companyName | STRING | company name for support contact |
| country | STRING | country of company for support contact |
| fax | STRING | fax number of company for support contact |
| icon | STRING | image file name for custom favicon in browser |
| image | STRING | image file name for custom image on support page |
| links | ARRAY | list of web links for customer support |
| label | STRING | label for hyperlink |
| text | STRING | text of hyperlink |
| url | STRING | url of hyperlink |
| logo | STRING | image file name for custom logo in header and on login page |
| phoneNumbers | ARRAY | list of phone numbers for customer support |
| label | STRING | phone number label |
| number | STRING | phone number |
| showOnDashboard | BOOL | enable or disable display of brand information on support page (default:false) |
| state | STRING | state or province of company for support contact |
| website | STRING | website of company for support contact |
| zipCode | STRING | zipCode of company for support contact |

4.3.6 certificate

Description: secure public key certificate configurations : OBJECT

| Element | Type | Description |
|--------------|--------|--|
| create | ACTION | creates a new certificate |
| commonName | STRING | rCell IP address that you use to connect to rCell |
| country | STRING | two letter code for the country for which the certificate is valid |
| days | UINT | number of days that certificate is valid (default:365) |
| emailAddress | STRING | email address of the person responsible for the rCell |
| locality | STRING | city or locality for which the certificate is valid |
| organization | STRING | organization name for which the certificate is valid |
| state | STRING | state or province for which the certificate is valid |
| details | OBJECT | current certificate information |
| credentials | STRING | certificate subject description |
| details | STRING | certificate details description |
| periodFrom | STRING | certificate start date |
| periodTo | STRING | certificate end date |
| upload | ACTION | uploades the new certificate (POST certificate file) |

4.3.7 ddns

Description: dynamic domain name server update remote server when ip address changes : OBJECT

| Element | Type | Description |
|----------------|--------|--|
| authentication | OBJECT | authentication information |
| password | STRING | password for ddns account |
| username | STRING | username for ddns account |
| checkIp | OBJECT | configure remote server to connect to |
| enabled | BOOL | enable or disable check IP feature (default:true) |
| port | UINT | port on remote server (default:80) |
| server | STRING | domain name of remote server (default:'checkip.dyndns.org') |
| domain | STRING | registered domain name |
| enabled | BOOL | enable or disable DDNS feature (default:false) |
| port | UINT | servers port number (default:80) |
| retriesMax | UINT | maximum number of tries to connect before failing (default:5) |
| server | STRING | name of server with currently assigned IP address (default:'members.dyndns.org') |
| system | STRING | system registration type, DYNAMIC or CUSTOM (default:DYNAMIC) |
| updateInterval | UINT | number of days between forced update (default:28) |

4.3.8 devices

Description: list of saved devices : ARRAY

| Element | Type | Description |
|--------------|--------|--|
| friendlyName | STRING | friendly name to associate with device |
| mac | STRING | mac address of device |
| name | STRING | name of device |

4.3.9 dhcp

Description: DHCP settings : OBJECT

| Element | Type | Description |
|----------------|--------|--|
| defaultGateway | STRING | default gateway of network (default:'192.168.2.1') |
| domain | STRING | network domain name |
| enabled | BOOL | enable or disable DHCP server (default:true) |
| fixedAddresses | ARRAY | list of fixed addresses |
| ip | STRING | ip address to assign to client |
| mac | STRING | mac address of client |
| leaseTime | UINT | number of seconds leases are issued for (default:86400) |
| leases | ARRAY | current leases issued by DHCP server |
| maxLeases | UINT | maximum number of leases that can be issued (default:200) |
| options | ARRAY | an array of additional dhcp options |
| rangeEnd | STRING | end ip address of dhcp lease range (default:'192.168.2.254') |
| rangeStart | STRING | start ip address of dhcp lease range (default:'192.168.2.100') |
| subnetAddress | STRING | subnet of network (default:'192.168.2.0') |
| subnetMask | STRING | mask of network (default:'255.255.255.0') |

4.3.10 dns

Description: dns forwarding feature : OBJECT

| Element | Type | Description |
|-----------|--------|---|
| enabled | BOOL | enable or disable dns server (default:true) |
| options | ARRAY | an array of additional dns options |
| primary | STRING | static ip address of primary dns server |
| secondary | STRING | static ip address of secondary dns server |

4.3.11 filters

Description: array of firewall filters : ARRAY

| Element | Type | Description |
|--------------|--------|---|
| action | STRING | action of filter: ACCEPT, REJECT, LOG or DROP |
| description | STRING | filter description |
| direction | STRING | direction of traffic: INGRESS or EGRESS |
| dstIp | STRING | ip address of destination or 'ANY' |
| dstMask | UINT | network mask of destination (0-32) |
| dstPortEnd | STRING | end of destination port range or 'ANY' |
| dstPortStart | STRING | beginning of destination port range or 'ANY' |
| enabled | BOOL | enable or disable this filter |
| name | STRING | name of filter |
| protocol | STRING | filter protocol, TCP, UDP or TCP/UDP |
| srcIp | STRING | ip address of source or 'ANY' |
| srcMac | STRING | mac address of source |
| srcMask | UINT | network mask of source (0-32) |
| srcPortEnd | STRING | end of source port range or 'ANY' |
| srcPortStart | STRING | beginning of source port range or 'ANY' |

4.3.12 gccp

Description: settings for gccp application : OBJECT

| Element | Type | Description |
|---------|------|--|
| enabled | BOOL | enable or disable gccp feature (default:false) |
| port | UINT | port to open on rCell for gccp connection (default:5000) |

4.3.13 gps

Description: gps service settings : OBJECT

| Element | Type | Description |
|----------------|--------|--|
| client | OBJECT | settings for gps client |
| enabled | BOOL | enable or disable gps client (default:false) |
| password | STRING | password to use when connecting to remote server |
| port | UINT | port to connect on remote server (default:5445) |
| protocol | STRING | protocol to when making connection, UDP or TCP (default:TCP) |
| remoteHost | STRING | ip address of remote server (default:'192.168.2.3') |
| nmea | OBJECT | specify what nmea sentences to send and how often to send them |
| gga | BOOL | global positioning system fix data (default:true) |
| gll | BOOL | geographic position, latitude/longitude (default:true) |
| gsa | BOOL | GPS DOP and active satellites (default:true) |
| gsv | BOOL | GPS Satellites in view (default:true) |
| id | STRING | optional id to attach to messages |
| idPrefix | STRING | optional prefix to attach to messages |
| interval | UINT | interval in seconds to send gps information (default:10) |
| rmc | BOOL | recommended minimum specific GPS/Transit data (default:true) |
| vtg | BOOL | track made good and ground speed (default:true) |
| server | | settings for gps server |
| dumpSerialPort | BOOL | output gps information to serial port (default:false) |
| enabled | BOOL | enable or disable gps server on rCell (default:false) |
| password | STRING | password needed for client to connect to server |
| port | UINT | port to for server to listen on (default:5445) |

4.3.14 greTunnels

Description: list of gre tunnels : ARRAY

| Element | Type | Description |
|-------------|--------|-------------------------------|
| description | STRING | description for gre tunnel |
| enabled | BOOL | enable or disable this tunnel |
| name | STRING | name of tunnel |
| remoteIP | STRING | remote ip of tunnel |
| routes | ARRAY | list or tunnel routes |
| ip | STRING | ip address of route |
| mask | STRING | network mask of route (0-32) |
| ttl | UINT | time to live (0-255) |

4.3.15 ipPipes

Description: list of configured IP Pipes : ARRAY

| Element | Type | Description |
|----------------|--------|---|
| activation | STRING | signal to start connection |
| description | STRING | summary of the pipe |
| enabled | BOOL | enable or disable this pipe |
| ip | STRING | ip address of the remote end of the pipe |
| mode | STRING | determines whether local end point is a client or server or both |
| name | STRING | label of the pipe |
| port | UINT | port number of the remote end point when in CLIENT mode, or listening port when in SERVER mode |
| protocol | STRING | the internet protocol to use (UDP, TCP or SSL/TLS) |
| secondaryIp | STRING | ip address of the second server to try if a connection can not be made to the first. Requires CLIENT mode |
| secondaryPort | STRING | port of the second server to try if a connection can not be made to the first. Requires CLIENT mode |
| sequence | STRING | the character or stream of characters that signal the pipe to terminate. Requires termination mode to be SEQUENCE |
| source | STRING | the source defines the local device to convert data to and from ip communication |
| termination | STRING | the mode for terminating the pipe |
| timeoutSeconds | UINT | the amount of seconds of inactivity allowed before the pipe will close. Requires termination mode to be TIMEOUT |
| type | STRING | the type of pipe. currently only serial-to-ip and bluetooth-to-ip are supported |

4.3.16 ipsecTunnels

Description: array of IPsec tunnels : ARRAY

| Element | Type | Description |
|-----------------------|--------|--|
| aggressiveMode | BOOL | [OPTIONAL] whether to allow a less secure mode that exchanges identification in plain text |
| authMethod | STRING | how the two security gateways should authenticate each other |
| compression | BOOL | whether IPComp compression of content is proposed on the connection |
| description | STRING | a note about the tunnel |
| enabled | BOOL | enable or disable this tunnel |
| encryptMethod | STRING | IKE encryption/authentication algorithm to be used for phase 1 and phase 2 of the connection |
| ikelife | UINT | how long the keying channel of a connection should last before being renegotiated (hours) |
| keylife | UINT | how long a particular instance of a connection should last, from successful negotiation to expiry (hours) |
| localId | STRING | how the local participant should be identified for authentication |
| name | STRING | label of tunnel |
| natTraversal | BOOL | [OPTIONAL] whether to accept or offer to support NAT workaround for IPsec |
| perfectForwardSecrecy | BOOL | whether Perfect Forward Secrecy of keys is desired on the connection's keying channel |
| phase1 | STRING | [OPTIONAL] specific algorithms to use for phase 1. Format: cipher-hash;group. Example: aes128-sha1;modp1024 |
| phase2 | STRING | [OPTIONAL] specific algorithms to use for phase 2. Format: cipher-hash;group. Example: aes128-sha1;modp1024 |
| psk | STRING | pre-shared key |
| remoteId | STRING | how the remote participant should be identified for authentication |
| remoteNetwork | STRING | saved network of remote end of tunnel |
| remoteNetworkIp | STRING | network at the remote end of tunnel |
| remoteNetworkMask | UINT | network mask at the remote end of tunnel |
| remoteWanIp | STRING | public ip of remote end of tunnel |
| retries | UINT | number of attempts that should be made to negotiate a connection, or a replacement for one, before giving up |
| type | STRING | type of ipsec tunnel: Internet Key Exchange is currently the only type supported |
| uid | BOOL | whether or not tunnel end points should be identified for authentication |

4.3.17 lan

Description: lan interface settings : OBJECT

| Element | Type | Description |
|---------|--------|---------------------------------------|
| gateway | STRING | default gateway (default:192.168.2.1) |
| ip | STRING | ip address (default:192.168.2.1) |
| mask | STRING | subnet mask (default:255.255.255.0) |

4.3.18 legacyDefaults

Description: legacy default settings, do not modify : OBJECT

| Element | Type | Description |
|---------|------|-------------|
|---------|------|-------------|

4.3.19 nat

Description: list of NAT rules for advanced firewall settings : ARRAY

| Element | Type | Description |
|--------------|--------|---------------------------------------|
| description | STRING | description of rule |
| direction | STRING | direction of rule, INGRESS or EGRESS |
| enabled | BOOL | enable or disable rule (default:true) |
| guid | STRING | rule guid |
| lanIp | STRING | LAN ip address of rule |
| lanPortEnd | STRING | LAN end port range of rule |
| lanPortStart | STRING | LAN beginning port range of rule |
| name | STRING | name of rule |
| protocol | STRING | TCP, UDP or TCP/UDP |
| type | STRING | SNAT or DNAT |
| wanIp | STRING | WAN ip address of rule or 'ANY' |
| wanPortEnd | STRING | WAN end port range or 'ANY' |
| wanPortStart | STRING | WAN beginning port range or 'ANY' |

4.3.20 networks

Description: array of networks to be used in setting filters and tunnels : ARRAY

| Element | Type | Description |
|---------|--------|--|
| ip | STRING | ip address of network |
| mask | UINT | network mask (0-32) |
| name | STRING | name of network |
| type | STRING | type of network, STATIC or DYNAMIC, configured networks should be set as DYNAMIC |

4.3.21 ppp

Description: PPP settings : OBJECT

| Element | Type | Description |
|-------------------|--------|--|
| authentication | OBJECT | PPP authentication settings |
| password | STRING | password of ppp account |
| type | STRING | type of authentication to use when connecting to ppp, PAP, CHAP or PAP-CHAP (default:'PAP-CHAP') |
| username | STRING | username of ppp account |
| connectTimeout | UINT | time in seconds to wait for a connection while in receive mode (default:90) |
| dialOnDemand | BOOL | enable or disable dial on demand : (default:false) |
| diversity | BOOL | enable or disable antenna diversity (default:true) |
| enabled | BOOL | enable or disable ppp connection (default:false) |
| idleTimeout | UINT | timeout in seconds before connection is considered idle and disconnected (default:180) |
| keepAlive | OBJECT | PPP keep alive settings |
| dataRecv | OBJECT | keep ppp connection alive as long as data is being received |
| enabled | BOOL | enable or disable data receive monitor (default:false) |
| window | UINT | time in minutes (default:0) |
| enabled | OBJECT | enable or disable keep alive feature |
| hostname | STRING | host to connect to |
| icmpCount | UINT | number of pings to send (default:4) |
| pingInterval | UINT | interval in seconds to send pings (default:60) |
| tcpPort | UINT | port on host to connect to (default:0) |
| type | STRING | method to use for keep alive, ICMP or TCP (default:ICMP) |
| maxRetries | UINT | maximum number of retries to attempt before failing (default:0) |
| modem | OBJECT | modem settings |
| apnString | STRING | apn connection string from service provider |
| baudRate | UINT | baud rate of modem (default:115200) |
| commands | ARRAY | list of at commands to send to modem after successfully connecting |
| connectString | STRING | string to send modem on successful connection (default:'CONNECT') |
| dialNumber | STRING | number for modem to dial for connection (default:'*99***1#') |
| dialPrefix | STRING | prefix to add to number (default:'ATDT') |
| initStrings | ARRAY | list of init strings to send to modem (default:['AT+CSQ']) |
| simPin | STRING | pin used to unlock sim for use |
| nat | BOOL | enable or disable nat feature (default:true) |
| powerOnInitString | STRING | string to send to radio on boot up |
| wakeUpOnCall | OBJECT | wake-up on call settings |
| ackString | STRING | string used to acknowledge (to the delivering SMSC) the receipt of an SMS |
| callerIds | OBJECT | list of valid caller ids for wake-up |
| action | STRING | action to perform on wake-up |
| text | STRING | text of wake-up SMS message or caller-id value |
| type | STRING | type of call: CALLER or SMS |
| delay | UINT | seconds to wait after call before reconnecting (default:10) |
| enabled | BOOL | enable or disable wake-up on call (default:false) |
| fromLan | BOOL | enable or disable wake-up on lan activity (default:false) |
| initStrings | ARRAY | list of cellular radio AT init strings |
| onCallerId | BOOL | enable or disable wake-up on caller id (default:false) |
| onRing | BOOL | enable or disable wake-up on ring (default:false) |
| onSms | BOOL | enable or disable wake-up on sms (default:false) |

4.3.22 remoteAccess

Description: settings to configure remote access of device : OBJECT

| Element | Type | Description |
|----------------------|--------|--|
| bruteForcePrevention | OBJECT | settings to configure login attempt throttling |
| enabled | BOOL | enable device to throttle username and password combination attempts (default:false) |
| failAttempts | UINT | set the number of consecutive failures before locking out an account (default:3) |
| lockoutSeconds | UINT | set the amount of seconds that a user account will be locked out (default:300) |
| dosAttackPrevention | OBJECT | settings to configure new connection throttling |
| enabled | BOOL | enable device to throttle number of new connection attempts to device (default:false) |
| limitBurst | UINT | set the upper limit of new connections allowed per minute (default:100) |
| limitPerMinute | UINT | set the average number of new connections allowed per minute (default:60) |
| http | OBJECT | settings to configure HTTP access to device |
| enabled | BOOL | (default:true) |
| lan | BOOL | enable HTTP access for LAN traffic (default:true) |
| port | UINT | set HTTP port (default:80) |
| redirectToHttps | BOOL | redirect request for HTTP port to HTTPS port (default:true) |
| wan | BOOL | enable HTTP access for WAN traffic (default:false) |
| https | OBJECT | settings to configure HTTPS access to device |
| enabled | BOOL | (default:true) |
| lan | BOOL | enable HTTPS access for LAN traffic (default:true) |
| port | UINT | set port for rcell configuration website (default:443) |
| wan | BOOL | enable HTTPS access for WAN traffic (default:false) |
| icmp | OBJECT | settings to configure ICMP access to device |
| enabled | BOOL | enable any response to icmp traffic (default:true) |
| respondToLan | BOOL | respond to lan icmp traffic (default:true) |
| respondToWan | BOOL | respond to wan icmp traffic (default:false) |
| pingLimit | OBJECT | settings to configure ICMP throttling |
| enabled | BOOL | enable device to throttle number of icmp packets allowed to device (default:false) |
| limitBurst | UINT | set the upper limit of icmp packets allowed per second (default:30) |
| limitPerSecond | UINT | set the average number of new connections allowed per second (default:10) |
| privateWan | BOOL | drop packets with private source addresses coming from public wan interfaces, i.e. spoofed packets (default:false) |
| ssh | OBJECT | settings to configure SSH access to device |
| enabled | BOOL | enable ssh access to the device (default:true) |
| lan | BOOL | allow ssh access from lan (default:true) |
| port | UINT | set the port for ssh access to the device (default:22) |
| wan | BOOL | allow ssh access from wan (default:false) |
| timeoutSeconds | UINT | (default:300) |

4.3.23 remoteManagement

Description: remote management settings : OBJECT

| Element | Type | Description |
|---------------------------|--------|--|
| accountKey | STRING | account key registered to user by device management platform |
| allowConfigurationUpgrade | BOOL | allow configuration upgrades to be managed through device management platform (default:true) |
| allowFirmwareUpgrade | BOOL | allow firmware upgrades to be managed through device management platform (default:true) |
| enabled | BOOL | enable the device to be managed by a remote management platform (default:false) |
| gpsDataInterval | UINT | set the gps push interval in seconds (default:43200) |
| queryServerInterval | UINT | set the check-in interval in seconds (default:43200) |
| serverName | STRING | remote management platform's url or IP address (default:ds.multitech.com) |
| serverPort | UINT | remote management platform's IP port (default:5798) |
| sslEnabled | BOOL | enable traffic encryption (default:true) |
| syncWithDialOnDemand | BOOL | only allow the device to contact the remote management platform when the cellular link is already up (default:false) |

4.3.24 routes

Description: list of static routes : ARRAY

| Element | Type | Description |
|---------|--------|------------------------------|
| gateway | STRING | default gateway of route |
| ip | STRING | ip address of route |
| mask | UINT | network mask of route (0-32) |
| name | STRING | name of route |

4.3.25 serial

Description: settings for serial port : OBJECT

| Element | Type | Description |
|-------------|--------|--|
| baudRate | UINT | (default:115200) |
| dataBits | UINT | (default:8) |
| flowControl | STRING | RTS-CTS or NONE (default:NONE) |
| modbus | BOOL | enable or disable modbus (default:false) |
| parity | STRING | ODD, EVEN or NONE (default:NONE) |
| stopBits | UINT | (default:1) |
| type | STRING | if device support flexible serial port: RS-232, RS-422, or RS-485 (default:RS-232) |

4.3.26 sms

Description: settings for sms : OBJECT

| Element | Type | Description |
|---------------|------|---|
| enabled | BOOL | enable or disable SMS service (default:true) |
| inbox | | a list of received SMS messages |
| outbox | | a list of sent SMS messages |
| receivedLimit | UINT | number of received SMS to keep. Set it to 0 if you do not want to keep SMS. Maximum is 1000, (default:1000) |
| resendLimit | UINT | the number of times that the modem retries sending the failed SMS message. Set it to 0 if you do not want to resend failed SMS messages. Maximum is 10. (default:3) |
| sentLimit | UINT | number of sent SMS to keep. Set it to 0 if you do not want to keep SMS. Maximum is 1000, (default:1000) |

4.3.27 smtp

Description: settings for smtp : OBJECT

| Element | Type | Description |
|--------------------|--------|--|
| enabled | BOOL | Enable SMTP to allow your router to send email messages (default:false) |
| maxNumberOfEntries | STRING | Specify the number of mail log entries to keep for completed emails in router. Minimum number is 10, maximum is 1000 |
| password | STRING | SMTP password |
| serverAddress | STRING | Address of SMTP server |
| serverPort | STRING | SMTP server's port number |
| sourceEmailAddress | STRING | Multi-Connect rCell Email address. The provided address will be displayed as the From address in the sent email |
| username | STRING | SMTP username |

4.3.28 sntp

Description: settings for clock synchronization between computer systems : OBJECT

| Element | Type | Description |
|-------------|--------|--|
| enabled | BOOL | enable or disable SNTP client (default:false) |
| pollingTime | UINT | frequency in minutes to poll current time (default:120) [0-1440] |
| server | STRING | ip address or domain name of server |
| timeZone | STRING | zoneinfo file path to use as timezone : (default:UTC) |

4.3.29 syslog

Description: settings for syslog support : OBJECT

| Element | Type | Description |
|-----------------|--------|--|
| cellDataHistory | UINT | The number of days to keep cellular history in router. |
| enabled | BOOL | enable or disable syslog daemon (default:false) |
| ethDataHistory | UINT | The number of days to keep ethernet history in router. |
| ipAddress | STRING | ip address of syslog server |
| logLevel | UINT | level of debug output to log, 20(warning), 30(info), 50(debug), 60(trace) or 100(maximum) (default:30) |
| outputToFile | BOOL | enable or disable syslog output to file (default:false) |
| saveDataLimit | UINT | Data limit in Mb to update the statistics. |
| saveTimeout | UINT | Timeout in seconds to update the statistics. |
| wifiDataHistory | UINT | The number of days to keep wifi history in router. |

4.3.30 system

Description: system attributes : OBJECT

| Element | Type | Description |
|--------------------|--------|---|
| capabilities | OBJECT | hardware capabilities |
| adc | BOOL | true if device supports analog inputs, otherwise false |
| bluetooth | BOOL | true if device supports bluetooth, otherwise false |
| din | BOOL | true if device supports digital inputs, otherwise false |
| dout | BOOL | true if device supports digital outputs, otherwise false |
| externalSerialPort | BOOL | true if device supports external serial port, otherwise false |
| flexibleSerialPort | BOOL | true if device supports flexible serial port, otherwise false |
| gps | BOOL | true if device supports gps, otherwise false |
| wifi | BOOL | true if device supports wifi, otherwise false |
| cmdtty | STRING | tty device to access used to issue at commands to radio |
| date | STRING | current system date |
| datetime | STRING | current system date and time |
| dbDirty | BOOL | true if is database in dirty state |
| defaultDeviceName | STRING | default name of device |
| deviceId | STRING | device id |
| deviceName | STRING | configured name of device |
| firmware | STRING | firmware version |
| firmwareDate | STRING | firmware built date |
| firstTimeSetup | BOOL | true if this is first run of device or has been reset to defaults |
| hardwareVersion | STRING | hardware version of device |
| imei | STRING | international mobile station equipment identity |
| imsi | STRING | international mobile subscriber identity |
| macAddress | STRING | mac address of ethernet port |
| macBluetooth | STRING | mac address of bluetooth module |
| macWifi | STRING | mac address of wifi module |
| memory | OBJECT | current memory stats |
| mode | STRING | system level mode of rcell (default:ROUTER) |
| oemId | STRING | configurable device id |
| permission | STRING | authorization level of the current user |
| ppptty | STRING | tty device used by ppp to make connections |
| productId | STRING | product id |
| radio | OBJECT | radio model number and type |
| carrier | STRING | current carrier providing cellular connectivity |
| code | STRING | radio model code number, H5, H6, EV3, C2, G3, LAT1, VW2 or LEU1 |
| type | STRING | type of radio, GSM or CMDA |
| restartNeeded | BOOL | true if settings have been changed and a restart is needed to reflect those changes in services |
| time | STRING | current system time of device |
| uptime | STRING | time unit has been running |
| user | STRING | current logged in user |
| vendorId | STRING | Multi-Tech Systems |
| webTitle | STRING | configurable title to display in browser |

4.3.31 users

Description: users collection for authentication : ARRAY

| Element | Type | Description |
|-------------|--------|---|
| name | STRING | name of user |
| password | STRING | current password (only used on password change) |
| newPassword | STRING | new password (only used on password change) |
| permission | STRING | permission level : ADMIN, USER, GUEST |

4.3.32 waninfo

Description: information on WAN interfaces : OBJECT

| Element | Type | Description |
|-----------|--------|---|
| wans | ARRAY | list of WANs |
| available | BOOL | indicates whether or not the WAN is available |
| enabled | BOOL | indicates whether or not the WAN is enabled |
| gateway | STRING | gateway used by WAN |
| interface | STRING | network interface |
| ip | STRING | the ip address assigned to this interface |
| name | STRING | name of WAN |
| subnet | STRING | subnet of network |
| type | STRING | type of WAN |

4.3.33 wanmgr

Description: settings for WAN management : OBJECT

| Element | Type | Description |
|---------------|--------|--|
| mode | STRING | WAN manager mode (default:'FAILOVER') |
| wans | ARRAY | WANs settings |
| interface | STRING | network interface |
| monitor | OBJECT | failover settings |
| active | OBJECT | active detection mode settings |
| hostname | STRING | host to connect to (default:'www.google.com') |
| icmpCount | UINT | number of pings to send. Minimum is 1, maximum is 200 (default:10) |
| tcpPort | UINT | port on host to connect to (default:80) |
| type | STRING | method to use for availability detection, ICMP or TCP (default:'ICMP') |
| checkInterval | UINT | set the failover check interval in seconds (default:300) |
| mode | STRING | set the failover availability detection mode (default:'ACTIVE') |
| priority | UINT | set the priority for WAN |
| weight | UINT | weight value is used for load balancing mode only |

4.3.34 wifi

Description: settings for wi-fi services : OBJECT

| Element | Type | Description |
|----------------|--------|--|
| ap | OBJECT | wi-fi access point settings |
| beaconInterval | UINT | time in msec between beacon frames (default:100) |
| channel | STRING | wireless channel to use. Valid entries are 1-14 depending on country code or AUTO (default:AUTO) |
| countryCode | STRING | two character operating country code |
| dtimInterval | UINT | frames between delivery traffic indication messages for buffered multicast/broadcast data (default:1) |
| enabled | BOOL | enable or disable the wifi access point (default:false) |
| maxClients | UINT | Maximum number of clients to allow on the Access Point at any given time (default: 8) |
| networkMode | STRING | access point radio mode of operation. Valid entries are b, n, bg or bgn (default:bgn) |
| rtsThreshold | UINT | request to send threshold (default:2347) |
| security | OBJECT | wi-fi access point security settings |
| algorithm | STRING | algorithm to use with WPA modes. Valid entries are TKIP, AES or TKIP+AES (default:TKIP+AES) |
| mode | STRING | security mode for access point. Valid entries are NONE, WEP, WPA-PSK or WPA2-PSK (default:NONE) |
| psk | STRING | pre-shared key for client authentication |
| ssid | STRING | network SSID, may only contain alpha-numeric characters and symbols not including ?, ", \$, [, \,] and + characters |
| client | OBJECT | wi-fi client settings |
| enabled | BOOL | enable or disable the wifi client (default:false) |
| mode | STRING | use the wifi interface as a WAN or LAN (default:WAN) |
| savedNetworks | ARRAY | list of network wi-fi client will use to find a connection |
| enabled | BOOL | enable or disable saved network when trying to connect |
| name | STRING | name of network |
| security | OBJECT | wi-fi client security settings |
| algorithm | STRING | algorithm to use with WPA modes. Valid entries are TKIP, AES or TKIP+AES (default:TKIP+AES) |
| mode | STRING | security mode (default:NONE) |
| password | STRING | password used to connect to network |
| psk | STRING | pre-shared key to connect to network |
| username | STRING | username used to connect to network |
| ssid | STRING | ssid of network |
| wpaConfig | OBJECT | settings gathered from wi-fi scan |
| networks | ARRAY | list of networks from last wifi scan |

5 Statistics

The API supports collecting dynamic system data through its Statistics URL. This data is read-only. Every call actively collects the latest data associated with the selected stats element. For a list of pollable options, use a GET request on [https://\[rcell_ip\]/api/stats](https://[rcell_ip]/api/stats).

| Statistic Group | Description |
|-----------------|-------------------------------|
| bluetooth | Bluetooth statistics |
| dns | Current DNS servers |
| eth | Current Ethernet state |
| ethHistory | Ethernet statistics history |
| ethTotal | Ethernet statistics summary |
| gps | GPS NMEA and statistics |
| gre | GRE Tunnel statistics |
| ipsec | IPsec Interface statistics |
| lan | Local Area Network statistics |
| modbus | Modbus statistics |
| ppp | PPP statistics |
| pppHistory | PPP statistics history |
| pppTotal | PPP statistics summary |
| serial | Serial port statistics |
| service | Various service status |
| wlan | WiFi statistics |
| wlanHistory | WiFi statistics history |
| wlanTotal | WiFi statistics summary |

Example Collecting latest PPP statistics:

```

1 GET https://192.168.2.1/api/stats/ppp
2
3 Status: HTTP/1.1 200 OK
4 {
5   "code" : 200,
6   "result" : {
7     "areaCode" : "7D0E",
8     "dnsServers" : [ "222.88.33.23" ],
9     "ip" : "142.133.12.40",
10    "link" : "PPP Link is up",
11    "localIp" : "142.133.12.40",
12    "mtu" : "1550",
13    "number" : "14831268306",
14    "remoteIp" : "192.168.202.0",
15    "roaming" : false,
16    "rssi" : "10",
17    "rx" : {
18      "bytes" : "102542",
19      "dropped" : "0",
20      "errors" : "0",
21      "frame" : "0",
22      "overruns" : "0",
23      "packets" : "797"
24    },
25    "tower" : "2802",
26    "tx" : {
27      "bytes" : "44841",
28      "carrier" : "0",
29      "collisions" : "0",
30      "dropped" : "0",
31      "errors" : "0",
32      "overruns" : "0",

```

```

33     "packets" : "648",
34     "queueLength" : "3 "
35   },
36   "uptime" : 104603
37 },
38 "status" : "success"
39 }

```

5.1 dns

Description: current dns server ip addresses : ARRAY

| Element | Type | Description |
|-----------|-------|---|
| dhcpLease | ARRAY | array of dns servers issued to dhcp clients with lease |
| servers | ARRAY | array of dns servers available for domain name resolution |

5.2 ethHistory

Description: daily statistics on ethernet interface traffic : ARRAY

| Element | Type | Description |
|---------|------|---------------------------------------|
| date | UINT | time stamp (in seconds) |
| todayRx | UINT | number of received bytes for a day |
| todayTx | UINT | number of transmitted bytes for a day |

5.3 ethTotal

Description: total and today statistics on the ethernet interface traffic : OBJECT

| Element | Type | Description |
|---------|------|---|
| todayRx | UINT | number of received bytes for today |
| todayTx | UINT | number of transmitted bytes for today |
| totalRx | UINT | number of received bytes for the stored period |
| totalTx | UINT | number of transmitted bytes for the stored period |

5.4 gps

Description: statistics and positional information of gps device : OBJECT

| Element | Type | Description |
|---------|--------|---|
| alt | STRING | altitude |
| data | ARRAY | a list of NMEA data strings containing latest gps information |
| fix | STRING | fix quality (0=Invalid, 1=GPS fix, 2 = DGPS fix) |
| lat | STRING | latitude coordinate |
| lng | STRING | longitude coordinate |
| sats | STRING | number of satellites |
| time | STRING | time |

5.5 gre

Description: statistics on gre tunnels (keys are tunnel names) : OBJECT

| Element | Type | Description |
|---------------|--------|--|
| tunnel | OBJECT | statistics on ipsec lan interface transmitted bytes |
| localIp | STRING | the ip address assigned to this interface |
| mode | STRING | tunnel mode |
| remoteIp | STRING | the ip address of the remote end of this tunnel |
| rx | OBJECT | statistics on gre tunnel received bytes |
| Mcasts | UINT | number of multicast packets received |
| bytes | UINT | number of received bytes |
| csumErrors | UINT | number of packets dropped because of checksum failures |
| errors | UINT | number of received byte errors |
| outOfSequence | UINT | number of packets dropped because they arrived out of sequence |
| packets | UINT | number of received packets |
| ttl | STRING | time to live (specified in seconds or inherited) |
| tx | OBJECT | statistics on gre tunnel transmitted bytes |
| bytes | UINT | number of transmitted bytes |
| deadLoop | UINT | number of packets which were not transmitted because the tunnel is looped back to itself |
| errors | UINT | number of transmitted errors |
| noBufs | UINT | number of packets which were not transmitted because the kernel failed to allocate a buffer |
| noRoute | UINT | number of packets which were not transmitted because there is no IP route to the remote endpoint |
| packets | UINT | number of transmitted packets |

5.6 ipsec

Description: statistics on ipsec interfaces : OBJECT

| Element | Type | Description |
|-------------|--------|---|
| ipsec0 | OBJECT | statistics on ipsec lan interface |
| ip | STRING | the ip address assigned to this interface |
| mtu | STRING | maximum transmission unit in bytes |
| rx | OBJECT | statistics on ipsec lan interface received bytes |
| bytes | STRING | number of received bytes |
| dropped | STRING | number of received byte drops |
| errors | STRING | number of received byte errors |
| frame | STRING | number of received frames |
| overruns | STRING | number of received overruns |
| packets | STRING | number of received packets |
| tx | OBJECT | statistics on ipsec lan interface transmitted bytes |
| bytes | STRING | number of transmitted bytes |
| carrier | STRING | number of transmitted carriers |
| collisions | STRING | number of transmitted collisions |
| dropped | STRING | number of transmitted drops |
| errors | STRING | number of transmitted errors |
| overruns | STRING | number of transmitted overruns |
| packets | STRING | number of transmitted packets |
| queueLength | STRING | number of packets that can be queued for transmission |
| ipsec1 | OBJECT | statistics on ipsec wan interface |
| ip | STRING | the ip address assigned to this interface |
| mtu | STRING | maximum transmission unit in bytes |
| rx | OBJECT | statistics on ipsec lan interface received bytes |
| bytes | STRING | number of received bytes |
| dropped | STRING | number of received byte drops |
| errors | STRING | number of received byte errors |
| frame | STRING | number of received frames |
| overruns | STRING | number of received overruns |
| packets | STRING | number of received packets |
| tx | OBJECT | statistics on ipsec lan interface transmitted bytes |
| bytes | STRING | number of transmitted bytes |
| carrier | STRING | number of transmitted carriers |
| collisions | STRING | number of transmitted collisions |
| dropped | STRING | number of transmitted drops |
| errors | STRING | number of transmitted errors |
| overruns | STRING | number of transmitted overruns |
| packets | STRING | number of transmitted packets |
| queueLength | STRING | number of packets that can be queued for transmission |

5.7 lan

Description: statistics on local area network : OBJECT

| Element | Type | Description |
|-------------|--------|---|
| ip | STRING | the ip address assigned to this interface |
| mtu | STRING | maximum transmission unit in bytes |
| rx | OBJECT | statistics on local area network received bytes |
| bytes | STRING | number of received bytes |
| dropped | STRING | number of received byte drops |
| errors | STRING | number of received byte errors |
| frame | STRING | number of received frames |
| overruns | STRING | number of received overruns |
| packets | STRING | number of received packets |
| tx | OBJECT | statistics on local area network transmitted bytes |
| bytes | STRING | number of transmitted bytes |
| carrier | STRING | number of transmitted carriers |
| collisions | STRING | number of transmitted collisions |
| dropped | STRING | number of transmitted drops |
| errors | STRING | number of transmitted errors |
| overruns | STRING | number of transmitted overruns |
| packets | STRING | number of transmitted packets |
| queueLength | STRING | number of packets that can be queued for transmission |

5.8 modbus

Description: statistics on modbus passthrough pipe : ARRAY

| Element | Type | Description |
|---------|--------|---------------------------------------|
| id | UINT | identification of device on bus |
| rx | UINT | number of bytes received by device |
| status | STRING | status of device |
| time | UINT | seconds since last activity |
| tx | UINT | number of bytes transmitted by device |

5.9 ppp

Description: statistics on ppp interface : OBJECT

| Element | Type | Description |
|-------------|--------|--|
| areaCode | STRING | identification code of area |
| dnsServers | ARRAY | an array of strings representing ip addresses of DNS servers |
| ip | STRING | the ip address assigned to this interface |
| link | STRING | status of the link |
| locallp | STRING | the ip address assigned to this interface |
| mtu | STRING | maximum transmission unit in bytes |
| number | STRING | cellular phone number |
| remotelp | STRING | the externally facing ip address of this interface |
| roaming | BOOL | indicates whether or not this connection is considered roaming |
| rssi | STRING | a value representing signal strength [0-31] |
| rx | OBJECT | statistics on ppp interface received bytes |
| bytes | STRING | number of received bytes |
| dropped | STRING | number of received byte drops |
| errors | STRING | number of received byte errors |
| frame | STRING | number of received frames |
| overruns | STRING | number of received overruns |
| packets | STRING | number of received packets |
| tower | STRING | tower identification number |
| tx | OBJECT | statistics on ppp interface transmitted bytes |
| bytes | STRING | number of transmitted bytes |
| carrier | STRING | number of transmitted carriers |
| collisions | STRING | number of transmitted collisions |
| dropped | STRING | number of transmitted drops |
| errors | STRING | number of transmitted errors |
| overruns | STRING | number of transmitted overruns |
| packets | STRING | number of transmitted packets |
| queueLength | STRING | number of packets that can be queued for transmission |
| uptime | UINT | number of minutes connection has been established |

5.10 pppHistory

Description: daily statistics on ppp interface traffic : ARRAY

| Element | Type | Description |
|---------|------|---------------------------------------|
| date | UINT | time stamp (in seconds) |
| todayRx | UINT | number of received bytes for a day |
| todayTx | UINT | number of transmitted bytes for a day |

5.11 pppTotal

Description: total and today statistics on the ppp interface traffic : OBJECT

| Element | Type | Description |
|---------|------|---|
| todayRx | UINT | number of received bytes for today |
| todayTx | UINT | number of transmitted bytes for today |
| totalRx | UINT | number of received bytes for the stored period |
| totalTx | UINT | number of transmitted bytes for the stored period |

5.12 radio

Description: statistics and information about the cellular radio : OBJECT

| Element | Type | Description |
|--------------|--------|--|
| carrier | STRING | cellular service provider (home network) |
| channel | STRING | ARFCN or UARFCN Assigned Radio Channel |
| cid | STRING | Cellular ID in HEX |
| code | STRING | MTS short model code [H5, H6, G3] |
| datetime | STRING | tower's date, time, and timezone. format MM/DD/YY HH:MM:SS GMT |
| debug | OBJECT | detailed information about the radio's current status (information may vary between radio types) |
| abnd | STRING | Active Band |
| bler | STRING | Block Error Rate (percentage) |
| drx | STRING | Discontinuous reception cycle length (ms) |
| ecio | STRING | Active Ec/Io (chip energy per total wideband power in dBm) |
| mm | STRING | Mobility Management State |
| nom | STRING | Network Operator Mode |
| psc | STRING | Primary Synchronization Code |
| rr | STRING | Radio Resource State |
| rscp | STRING | Active RSCP (Received Signal Code Power in dBm) |
| sd | STRING | Service Domain |
| txpwr | STRING | Transmit Power |
| firmware | STRING | radio firmware version |
| hardware | STRING | radio hardware revision |
| iccid | STRING | Integrated Circuit Card Identifier (Not available for CDMA) |
| imsi | STRING | International Mobile Subscriber Identity (Not Available on CDMA) |
| lac | STRING | Location Area Code in HEX |
| manufacturer | STRING | radio manufacturer |
| mcc | STRING | Mobile Country Code |
| mdn | STRING | Mobile Directory Number |
| meid | STRING | Mobile Equipment Identifier (CDMA Only) |
| mipProfile | OBJECT | Mobile IP configuration (CDMA Only) |
| enabled | BOOL | Indicates if this profile is active or not |
| homeAddress | STRING | Home Address |
| id | UINT | MIP Profile ID |
| mnAaaSpi | STRING | Mobile Node Authentication, Authorization, and Accounting Server Security Parameter Index |
| mnAaaSs | BOOL | Whether or not the Mobile Node Authentication, Authorization, and Accounting Server Shared Secret has been set |
| mnHaSpi | STRING | Mobile Node Home Agent Security Server Parameter Index |
| mnHaSs | BOOL | Whether or not the Mobile Node Home Agent Shared Secret has been set |
| nai | STRING | Network Access Identifier |
| primaryHa | STRING | Primary Home Agent |
| revTun | BOOL | Reverse Tunneling Enabled |
| secondaryHa | STRING | Secondary Home Agent |
| mnc | STRING | Mobile Network (Operator) Code |
| model | STRING | radio model [HE910-D, HE910-EUD, GE910, DE910, CE910, ...] |
| msid | STRING | Mobil Station ID aka MIN aka MSIN |
| network | STRING | current cellular service provider (Not available for CDMA) |
| provisioned | BOOL | Whether or not the radio has been activated with a data account (CDMA only) |
| rac | STRING | Routing Area Code in HEX |
| roaming | BOOL | indicates whether or not using Home Network |
| rssi | UINT | Received Signal Strength Indication |
| rssidBm | STRING | Received Signal Strength Indication in dBm |
| service | STRING | service connection type [GPRS, EGPRS, WCDMA, HSDPA] |
| type | STRING | radio technology category [GSM, CDMA, LTE] |

5.13 serial

Description: statistics on serial interface : OBJECT

| Element | Type | Description |
|---------|--------|---|
| dcd | STRING | status of dcd |
| rx | UINT | number of bytes received on serial interface |
| tx | UINT | number of bytes transmitted on serial interface |

5.14 service

Description: status on various services : OBJECT

| Element | Type | Description |
|--------------|--------|--|
| ddns | OBJECT | status on ddns services |
| enabled | BOOL | indicates whether or not service is employed |
| status | STRING | status of ddns |
| dialOnDemand | OBJECT | status on dial-on-demand services |
| enabled | BOOL | indicates whether or not service is employed |
| status | STRING | status of dial-on-demand |
| keepAlive | OBJECT | status on keep-alive services |
| enabled | BOOL | indicates whether or not service is employed |
| status | STRING | status of keep-alive |
| sntp | OBJECT | status on sntp services |
| enabled | BOOL | indicates whether or not service is employed |
| status | STRING | status of sntp |

5.15 status

Description: a list of important system events : ARRAY

| Element | Type | Description |
|-----------|--------|---|
| guid | STRING | unique traceable identifier of the event source |
| msg | STRING | the message describing the event |
| timestamp | STRING | the time when the event occurred (UTC) |
| type | STRING | the event classification [INFO, WARNING, ERROR] |

5.16 wlan

Description: statistics on wlan interface : OBJECT

| Element | Type | Description |
|-------------|--------|---|
| channels | ARRAY | array of available channels |
| countryCode | STRING | code used to assign wifi hardware to use country's authorized frequencies |
| ip | STRING | the ip address assigned to this interface |
| link | STRING | status of the wifi link |
| mtu | STRING | maximum transmission unit in bytes |
| rx | OBJECT | statistics on wifi interface received bytes |
| bytes | STRING | number of received bytes |
| dropped | STRING | number of received byte drops |
| errors | STRING | number of received byte errors |
| frame | STRING | number of received frames |
| overruns | STRING | number of received overruns |
| packets | STRING | number of received packets |
| tx | OBJECT | statistics on wifi interface transmitted bytes |
| bytes | STRING | number of transmitted bytes |
| carrier | STRING | number of transmitted carriers |
| collisions | STRING | number of transmitted collisions |
| dropped | STRING | number of transmitted drops |
| errors | STRING | number of transmitted errors |
| overruns | STRING | number of transmitted overruns |
| packets | STRING | number of transmitted packets |
| queueLength | STRING | number of packets that can be queued for transmission |

5.17 wlanHistory

Description: daily statistics on wlan interface traffic : ARRAY

| Element | Type | Description |
|---------|------|---------------------------------------|
| date | UINT | time stamp (in seconds) |
| todayRx | UINT | number of received bytes for a day |
| todayTx | UINT | number of transmitted bytes for a day |

5.18 wlanTotal

Description: total and today statistics on the wlan interface traffic : OBJECT

| Element | Type | Description |
|---------|------|---|
| todayRx | UINT | number of received bytes for today |
| todayTx | UINT | number of transmitted bytes for today |
| totalRx | UINT | number of received bytes for the stored period |
| totalTx | UINT | number of transmitted bytes for the stored period |

6 Appendix

6.1 REST Architecture

A REST (Representational State Transfer) architecture is a style for interacting with distributed systems and is commonly used in websites. There are four methods to REST: POST, GET, PUT, and DELETE. These actions expose the four basic functions of persistent storage: Create, Read, Update, and Delete (CRUD). The responses to these RESTful actions can be returned in various formats. A RESTful JSON API responds to REST requests with JSON.

6.2 JSON Data

JSON (JavaScript Object Notation) is a text-based human-readable data interchange that represents simple data structures and associative arrays.

6.3 Examples

6.3.1 Using Curl to log in

```
1 curl -k "https://192.168.2.1/api/login?username=admin&password=admin"
```

Curl result:

```
1 {
2   "code" : 200,
3   "result" : {
4     "address" : "192.168.2.103",
5     "permission" : "admin",
6     "port" : "52222",
7     "timestamp" : "14:30:5:957",
8     "token" : "2442CB0CB60B2EE9F5A35DF5ED8C33",
9     "user" : "admin"
10  },
11  "status" : "success"
12 }
```

Verbose Curl result:

```
1 * About to connect() to 192.168.2.1 port 443 (#0)
2 *   Trying 192.168.2.1... connected
3 *   successfully set certificate verify locations:
4 *     CAfile: none
5 *     CApath: /etc/ssl/certs
6 *   SSLv3, TLS handshake, Client hello (1):
7 *   SSLv3, TLS handshake, Server hello (2):
8 *   SSLv3, TLS handshake, CERT (11):
9 *   SSLv3, TLS handshake, Server finished (14):
10 *   SSLv3, TLS handshake, Client key exchange (16):
11 *   SSLv3, TLS change cipher, Client hello (1):
12 *   SSLv3, TLS handshake, Finished (20):
13 *   SSLv3, TLS change cipher, Client hello (1):
14 *   SSLv3, TLS handshake, Finished (20):
15 *   SSL connection using ECDHE-RSA-AES256-SHA
16 *   Server certificate:
17 *     subject: C=US; ST=Minnesota; L=Minneapolis; CN=rCell.example.com
18 *     start date: 2013-05-01 16:31:06 GMT
```



```

19 *   expire date: 2014-05-01 16:31:06 GMT
20 *   issuer: C=US; ST=Minnesota; L=Minneapolis; CN=rCell.example.com
21 *   SSL certificate verify result: self signed certificate (18), continuing anyway.
22 > GET /api/login?username=admin&password=admin HTTP/1.1
23 > User-Agent: curl/7.22.0 (x86_64-pc-linux-gnu) libcurl/7.22.0 OpenSSL/1.0.1 zlib/1.2.3.4
    libidn/1.23 librtmp/2.3
24 > Host: 192.168.2.1
25 > Accept: */*
26 >
27 < HTTP/1.1 200 OK
28 < Set-Cookie: token=5810A57DF87328951FF1901027A09A74; Max-Age=300; Path=/; Secure
29 < Cache-Control: no-cache
30 < Content-type: application/json
31 < Transfer-Encoding: chunked
32 < Date: Wed, 15 Jan 2014 14:56:09 GMT
33 < Server: rCell
34 <
35 {
36   "code" : 200,
37   "result" : {
38     "address" : "192.168.2.103",
39     "permission" : "admin",
40     "port" : "43516",
41     "timestamp" : "14:56:9:363",
42     "token" : "5810A57DF87328951FF1901027A09A74",
43     "user" : "admin"
44   },
45   "status" : "success"
46 }
47 * Connection #0 to host 192.168.2.1 left intact
48 * Closing connection #0
49 * SSLv3, TLS alert, Client hello (1):

```

6.3.2 Using Curl to enable PPP

```

1 curl -k -X PUT -H "Content-Type: application/json" -d '{
2   "enabled" : true,
3 }' https://192.168.2.1/api/ppp?token=2442CB0CB60B2EE9F5A35DF5ED8C33

```

Curl result:

```

1 {
2   "code" : 200,
3   "status" : "success"
4 }

```

6.3.3 Using Curl to add a firewall DNAT rule

```

1 curl -k -X POST -H "Content-Type: application/json" -d '{
2   "description" : "",
3   "direction" : "INGRESS",
4   "enabled" : true,
5   "guid" : "FTP-SERVER-DNAT",
6   "lanIp" : "192.168.2.103",
7   "lanPortEnd" : 21,
8   "lanPortStart" : 20,
9   "name" : "FTP-SERVER",
10  "protocol" : "TCP",
11  "type" : "DNAT",
12  "wanIp" : "ANY",
13  "wanMask" : 32,
14  "wanPortEnd" : "21",
15  "wanPortStart" : "20"
16 }' https://192.168.2.1/api/nat?token=2442CB0CB60B2EE9F5A35DF5ED8C33

```

Curl result:

```

1 {
2   "code" : 200,
3   "status" : "success"
4 }

```

6.3.4 Using Curl to add a firewall filter rule

```

1 curl -k -X POST -H "Content-Type: application/json" -d '{
2   "action" : "ACCEPT",
3   "description" : "",
4   "direction" : "INGRESS",
5   "dstIp" : "192.168.2.103",
6   "dstMask" : 32,
7   "dstNetwork" : "",
8   "dstPortEnd" : 21,
9   "dstPortStart" : 20,
10  "enabled": true,
11  "name" : "FTP-SERVER",
12  "protocol" : "TCP",
13  "srcIp" : "ANY",
14  "srcMask" : 32,
15  "srcMac" : "",
16  "srcNetwork" : "",
17  "srcPortEnd" : "ANY",
18  "srcPortStart" : "ANY"
19 }' https://192.168.2.1/api/filters?token=2442CB0CB60B2EE9F5A35DF5ED8C33

```

Curl result:

```

1 {
2   "code" : 200,
3   "status" : "success"
4 }

```

6.3.5 Using Curl to delete a firewall filter rule by name

```
1 curl -k -X DELETE
2 "https://192.168.2.1/api/filters/FTP-SERVER?token=2442CB0CB60B2EE9F5A35DF5ED8C33"
```

Curl result:

```
1 {
2   "code" : 200,
3   "status" : "success"
4 }
```

6.3.6 Using Curl to delete a firewall filter rule by index

```
1 curl -k -X DELETE
2 "https://192.168.2.1/api/filters/0?token=2442CB0CB60B2EE9F5A35DF5ED8C33"
```

Curl result:

```
1 {
2   "code" : 200,
3   "status" : "success"
4 }
```

6.3.7 Using Curl to save current configurations and reboot

```
1 curl -k -X POST -d ""
2 "https://192.168.2.1/api/command/save_restart?token=2442CB0CB60B2EE9F5A35DF5ED8C33"
```

Curl result:

```
1 {
2   "code" : 200,
3   "status" : "success"
4 }
```