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S09 – Trigger Based Integration with External API Platforms

Alianza
Apogee
Baicells
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ClearCable NOMS
cnMaestro
Dashan Zhone NMS
Dashan Zhone ACS
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LibreNMS
Payment Gateway
Plume
rnControl
SIMPLer API
SIMPLer equipment
Simwood
SMS
Telrad LTE (with Aradial/iHSS)
uISP
Vetro

Azotel Technologies Ltd,
3rd Floor, River House,
Blackpool Park,
Cork,
Republic of Ireland.

Azotel Canada Inc.
325 Vulcan Avenue
NS B1P 5X1
Sydney
Canada

Azotel Poland
ul. Kwiatkowskiego 24
55-011 Siechnice
Poland

Phone (EMEA): +353-21-234-8100
Phone (North America): +1-312-239-0680 / +1-902-539-2665
Phone (Poland): +48-71-710-1530
Phone (UK): +44-20-719-3417
Phone (South Africa): +27-11-083-6900
Fax: +353-21-467-1699
info@azotel.com

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1 Introduction

The purpose of this document is to outline SIMPLer's trigger based integration with external platforms via their respective API's.

2 Trigger Based Integration with Remote API's

2.1 Introduction

While SIMPLer offers a comprehensive set of features that help operators to run their day to day activities efficiently from one platform – on certain occasions operators might have other solutions deployed that would benefit from being synchronized with SIMPLer i.e. to avoid double data entry etc.

The trigger based integration has been developed to address cases where the remote platform is unable to use SIMPLer API to synchronize data, while having its own API available. In such cases SIMPLer can push data to these platforms upon a number of triggered events. These events cover changes of most of the important information in the SIMPLer platform (i.e. customer, equipment, CPE details change can trigger an API call).

Above being said if there is any specific event that is required to complete a particular integration – Azotel can review the possibility of building it in.

2.2 Triggers List

The trigger list defines number of synchronization options that can be utilized in communication with remote API's. The operator can select which triggers shall be enabled to suit his/her requirements.

To summarize, when data related to an enabled trigger is being changed a communication is initiated with all enabled API's. It does not matter how the data was changed i.e., whether it has been modified from the GUI, or via a backend script, SIMPLer API or even directly from the database console. If it has been changed in any way respective trigger actions will be executed.

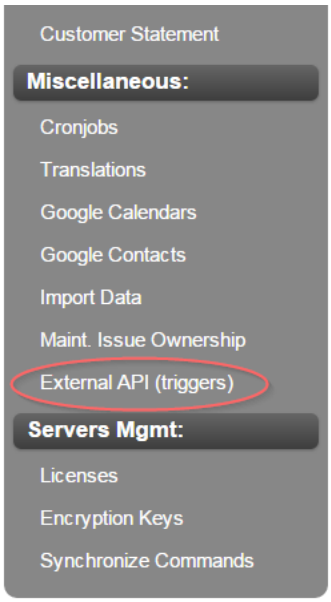
The following is a list of currently implemented triggers:

- ***Customer Details Change*** – any changes to the main customer record (i.e., changing name, address) apart from table content such as subscriptions, IP addresses, customer equipment, etc, as these have their own dedicated triggers. This customer details change trigger can be used to synchronize customer accounts with the remote platform.
- ***Customer Status Change*** - any changes of a customer status (i.e., from 'current' to 'post'). This trigger can be used instead of the previously described *'Customer Details Change'* as a light way to synchronize the customer account status if required.
- ***Product Change*** – any changes made to product details (i.e., changing code, price, description). This trigger can be used to synchronize products offered by the operator with a remote platform. This could be very useful for example in cases where the operator wants to update list of products sold on his website automatically.
- ***Credit Card Change*** - any changes made to credit card information. This trigger can be used to inform a remote platform about any Credit Card changes made in SIMPLer – it does not send crucial credit card details though – only customer name and address plus last four digits will be sent.
- ***EFT Change*** – generating and modifying Bank Deposits / EFT / Non-EFT transactions. This could be used to synchronize SIMPLer with a billing platform.
- ***Invoice Change*** - invoice generation / status changes (i.e., 'emailed', 'paid' etc.). This could be used to synchronize SIMPLer with a billing platform.
- ***Subscription Change*** - customer subscription changes. This could be used for example to provision appropriate services on a Network Access Server or to synchronize with a billing platform.
- ***Customer Subscriptions*** – this is similar to above and triggered upon customer subscription change with a difference that here a full list of customer subscriptions are sent through to the remote API. Using this function instead of the 'Subscription Change' is recommended.

- ***Customer SAND Notification*** – SAND (Subscriber Auto Notify/Disconnect) actions executed on customer account (i.e. Sending SAND Notifications, Throttling, Disconnection etc.). This trigger works well as a far more detailed alternative to *'Customer Status Change'* trigger. Recommended to use where detailed information about customer status change is required.
- ***RADIUS Username Change*** – RADIUS Username / User group / User Check & Reply changes. This trigger can be used to synchronize built-in RADIUS database SIMPLer with a remote, non-FreeRADIUS based RADIUS server. As most of RADIUS servers share the same concept due to a workflow coming from RADIUS protocol – typically it is very easy to translate a FreeRADIUS database to any other server. This has been done with Aradial for example.
- ***RADIUS Send CoA / PoD*** - each time a CoA/PoD is being sent by the SIMPLer platform, which happens upon customer status changes as well as on Authorization = (i.e. link speed) changes. This can be used to terminate a customer CPE session from the remote, integrated server, which would force it to re-authenticate.
- ***Customer Equipment Change*** – customer equipment changes. Upon every CPE change – this trigger will send a full list of customer equipment to the remote API. This trigger is recommended to synchronize equipment in the remote platform.

2.3 Configuration

Trigger Based Integration with external platform API's can be configured from the ***'Settings'*** page in SIMPLer. The configuration page can be reached under the ***'External API (triggers)'*** position in the left side menu (see Fig. 2.3.1).

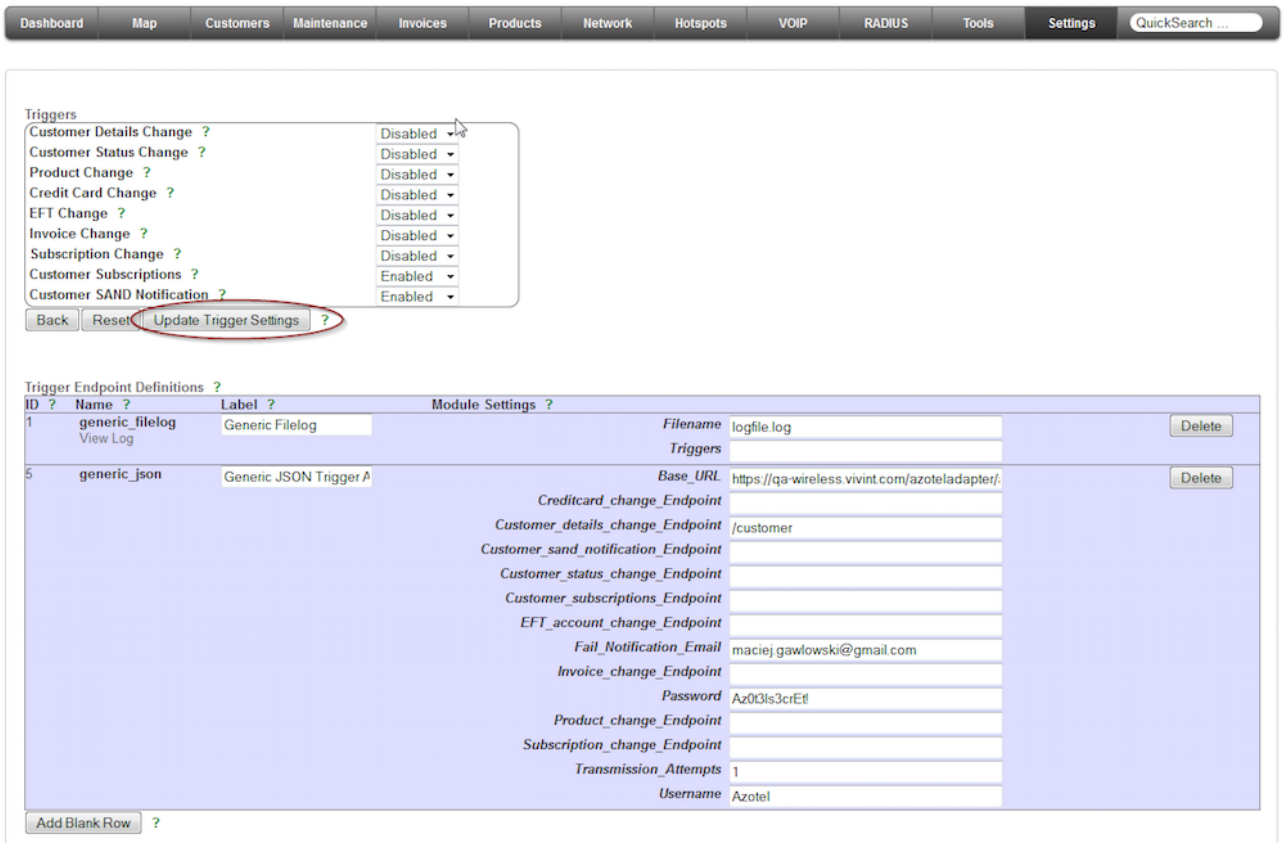


2.3.1 'External API (triggers)' link

The configuration page is split into two sections:

1. Triggers – this section allows the operator to enable / disable triggers. It is recommended to enable only a subset of triggers required for integration with a particular remote API, as each trigger execution will require some CPU/memory resources to be processed. Each API (apart from 'Generic REST/JSON' and 'Generic Filelog') supports only a subset of triggers anyway. Please refer to the particular API section for more information on which triggers can be enabled for each API.
2. Trigger Endpoint Definition – this section enables operator to choose API's which triggered information will be communicated and sent to. Each trigger endpoint will require a number of unique options to be set i.e. API

IP address, Username, Password etc. Please refer to the particular API related chapter for more details on the above.



2.3.2 'External API (triggers)' page

The operator can add as many trigger endpoints as they like. Currently SIMPLer has built in support for following API's:

- **Generic REST/JSON** – this is a generic interface and as such it will require the operator to build a dedicated API on the remote server to support it. Upon being triggered it sends data using Rest/JSON. This integration method is recommended in cases where the API on the remote server has not yet been deployed and as such can be developed to specification.
- **Telrad LTE CPE (with Aradial server)** – this is an API interface tailored to work with the Aradial server supporting Telrad equipment networks. It helps to interface with Telrad networks and allows SIMPLer to directly provision LTE CPE devices.
- **ClearCable** NOMS – this is an API interface tailored to synchronize SIMPLer accounts to the NOMS platform – which is used as a subscriber database for ClearCable VoIP.
- **Generic Filelog** - on a trigger - set of details related to the trigger (such as customer record details for customer details update trigger) will be saved to a file specified in the Filename field. This log can be viewed from "View Log" button.

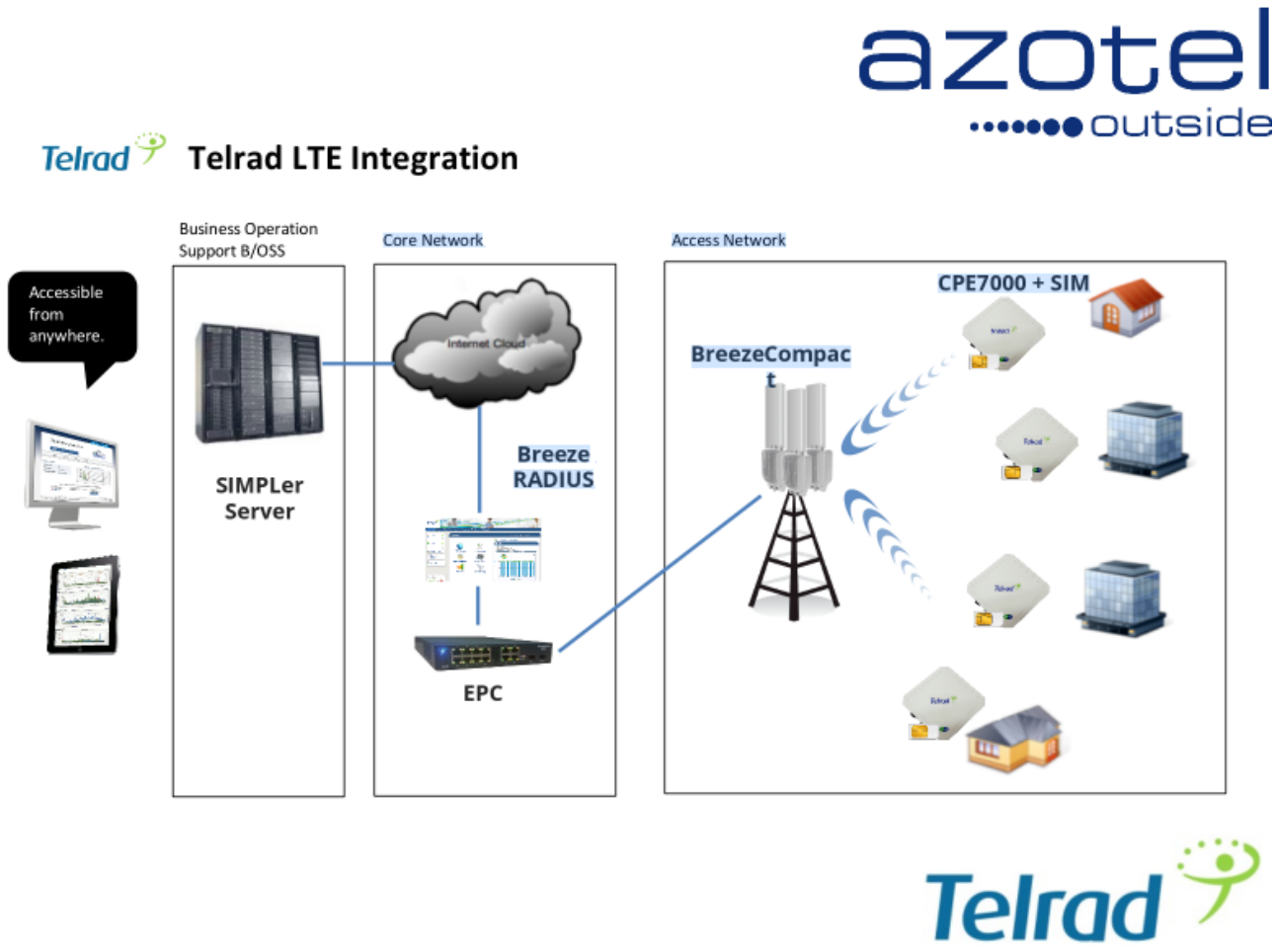
3 Telrad – Aradial Integration

3.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and Telrad Networks for LTE deployments.

Any Telrad Networks managed with the EPC/Breeze RADIUS (Aradial) can be integrated with the Azotel SIMPLer platform. SIMPLer uses the Breeze RADIUS (Aradial) API to synchronize customer accounts. Telrad BreezeCampact Access Points are natively integrated with the Breeze RADIUS hence any user account pushed to the server will immediately be available to use on any Access Point that is authenticating CPE's off the Access Point.

Customers are using Telrad CPE's with SimCards. In reality, it is the SIM Card details that actually are used to authenticate the customer on to the network – CPE's can be swapped upon failure – as long as the SimCard remains the same – it will be authenticated seamlessly after the swap. Upon authentication the CPE sends the SimCard details to BreezeCompact Access Point which forwards the SimCard identity to the Breeze RADIUS server. If a particular user (SIM Card) is set on the Breeze RADIUS server – the CPE it is on will get authenticated to the network and any usage generated by it – will be accounted towards the customer account.



3.1.1 Telrad Integration Diagram

3.2 Telrad / Aradial trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

Before setting up Telrad / Aradial, the below API access details must be obtained from Telrad:

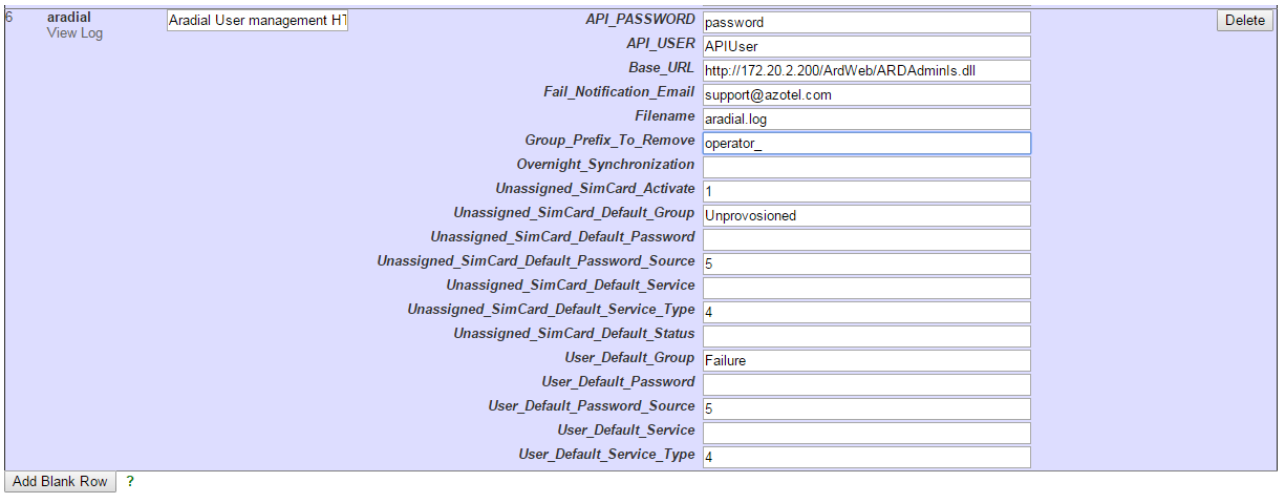
- ***API Base URL*** - this is the API URL that will be used by SIMPLer to communicate with i.e. http://172.20.2.200/ArdWeb/ARDAdminIs.dll
- ***API User*** – Username SIMPLer platform should send to authenticate with API
- ***API Password*** – Password related to the Username

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module:

- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent to any location.
- ***Filename*** –name for a log file to store base operation details performed through the interface.
- ***Group_Prefix_To_Remove*** – if defined, this option helps to remove any prefix from group attributes passed through the API. This typically would be set to 'operator_' to help remove automatically added 'operator_' prefix to each RADIUS group in SIMPLer.
- ***Overnight_Synchronization*** **–** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Telrad RADIUS server. This is option is not recommended to use unless there are multiple communication issues between SIMPLer and Aradial server.
- ***Unassigned_SimCard_Activate*** **–** if set to "1" it enables synchronization of SimCards that are not assigned to any customer account in SIMPler. Accounts added to Aradial will be active with pre-set profiles. This can help to pre-activate SimCards with a "Walled Gardened" profile. That than can be used for easier installation. Once a SimCard is assigned to a customer in SIMPLer this account in Telrad will be "taken over" and provisioned with customer details, rather than the default profile.
- ***Unassigned_SimCard_Default_Group*** **–** profile group that is to be used for Telrad Aradial accounts that are created for SimCards unassigned to a customer account in SIMPLer. This should be a dedicated group that will restrict resources for these SimCard accounts (i.e. apply Walled Garden, allocate IP from a private IP subnet, limit connection speeds).
- ***Unassigned_SimCard_Default_Password*** **–** password that is to be used for Telrad Aradial accounts that are created for SimCards unassigned to a customer account in SIMPLer. Typically this is to be left blank in the Telrad network integrations as SimCard KI and OPCode are used for authentication. Set this attribute only if required.
- ***Unassigned_SimCard_Default_Password_Source*** **–** password source that is to be used for Telrad Aradial accounts that are created for SimCards unassigned to a customer account in SIMPLer. Typically this is to be set to "5" (No Password) in the Telrad network integrations as SimCard KI and OPCode are used for authentication. Set this attribute to other value only if otherwise instructed.
- ***Unassigned_SimCard_Default_Service*** **–** service name that is to be used for Telrad Aradial accounts that are created for SimCards unassigned to a customer account in SIMPLer. Typically this option should be left blank unless otherwise instructed.
- ***Unassigned_SimCard_Default_Service_Type*** **–** service type that is to be used for Telrad Aradial accounts that are created for SimCards unassigned to a customer account in SIMPLer. Typically this option should be set to "4" (LTE) unless otherwise instructed.
- ***Unassigned_SimCard_Default_Status*** **–** user state that is to be used for Telrad Aradial accounts that are created for SimCards unassigned to a customer account in SIMPLer. Typically this should be left blank which will result in 'active' account, otherwise use "1" for cancelled, "2" for prospective and "3" for suspended.
- ***User_Default_Group*** **-** profile group that is to be used for Telrad Aradial accounts that for whatever reason have no RADIUS group assigned to a customer account in SIMPLer.
- ***User_Default_Password*** **–** password that is to be used for Telrad Aradial accounts created for customer accounts in SIMPLer. Typically this is to be left blank in the Telrad network integrations as SimCard KI and OPCode are used for authentication – set this attribute only if required.
- ***User_Default_Password_Source*** **-** password source that is to be used for Telrad Aradial accounts created for customer accounts in SIMPLer. Typically this is to be set to "5" (No Password) in the Telrad network integrations as SimCard KI and OPCode are used for authentication – set this attribute to other value only if otherwise instructed.

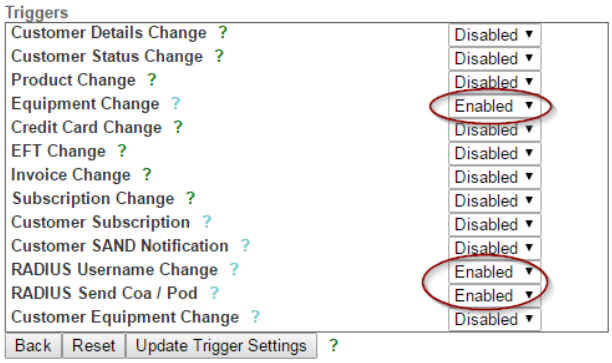
- ***User_Default_Service -*** service name that is to be used for Telrad Aradial accounts that are created for customer accounts in SIMPLer. Typically this option should be left blank unless otherwise instructed.
- ***User_Default_Service_Type -*** service type that is to be used for Telrad Aradial accounts that are created for customer accounts in SIMPLer. Typically this option should be set to "4" (LTE) unless otherwise instructed.



3.2.1 Example Telrad API configuration entry

The Telrad API requires triggers shown on the screenshot at Fig. 3.2.1 to be enabled as a part of the configuration process:

- ***RADIUS Username Change*** – enabling this trigger is required to synchronize SimCards assigned to customer accounts.
- ***Equipment Change*** – enabling this trigger is required to synchronize SimCards that are not assigned to any customers.
- ***RADIUS Send Coa / Pod*** – enabling this trigger is required to re-authenticate customer CPEs with new settings upon any account changes.



3.2.1 Example Telrad API configuration entry

3.3 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled, as the synchronization with the Aradial server uses SIMPLer RADIUS to store synchronized accounts as well as to collet usage statistics.
- ***Bucket*** – Preferably mapped to a RADIUS group for automation purposes (i.e. changing QoS profile in Telrad based on bucket the customer is assigned to).
- ***SimCard*** – SimCard should have KI and OPCODE for the integration to work – unless there is already one set.
- ***Telrad CPE LTE*** – SimCard should be assigned to this Telrad CPE – which will enable the synchronization module.

Once the above conditions are met, the account from SIMPLer should be synchronized to the Telrad / Aradial server.

Note: In the case of equipment that was pre-imported to the system, once the process of assigning equipment to customers has been completed, any SIM Card account that was previously activated under the server as unassigned, will now take the correct settings from the customer account.

Below please find the steps required to set up a customer account in SIMPLer with a SIM Card and a Telrad CPE:

- **Step One**: Change the customer gateway to the 'Radius Enabled Gateway' (See Fig. 3.3-1) and change the bucket to whatever it should be for the particular customer, unless the bucket is subscription driven, in which case please make sure an appropriate subscription has been set under the customer account.

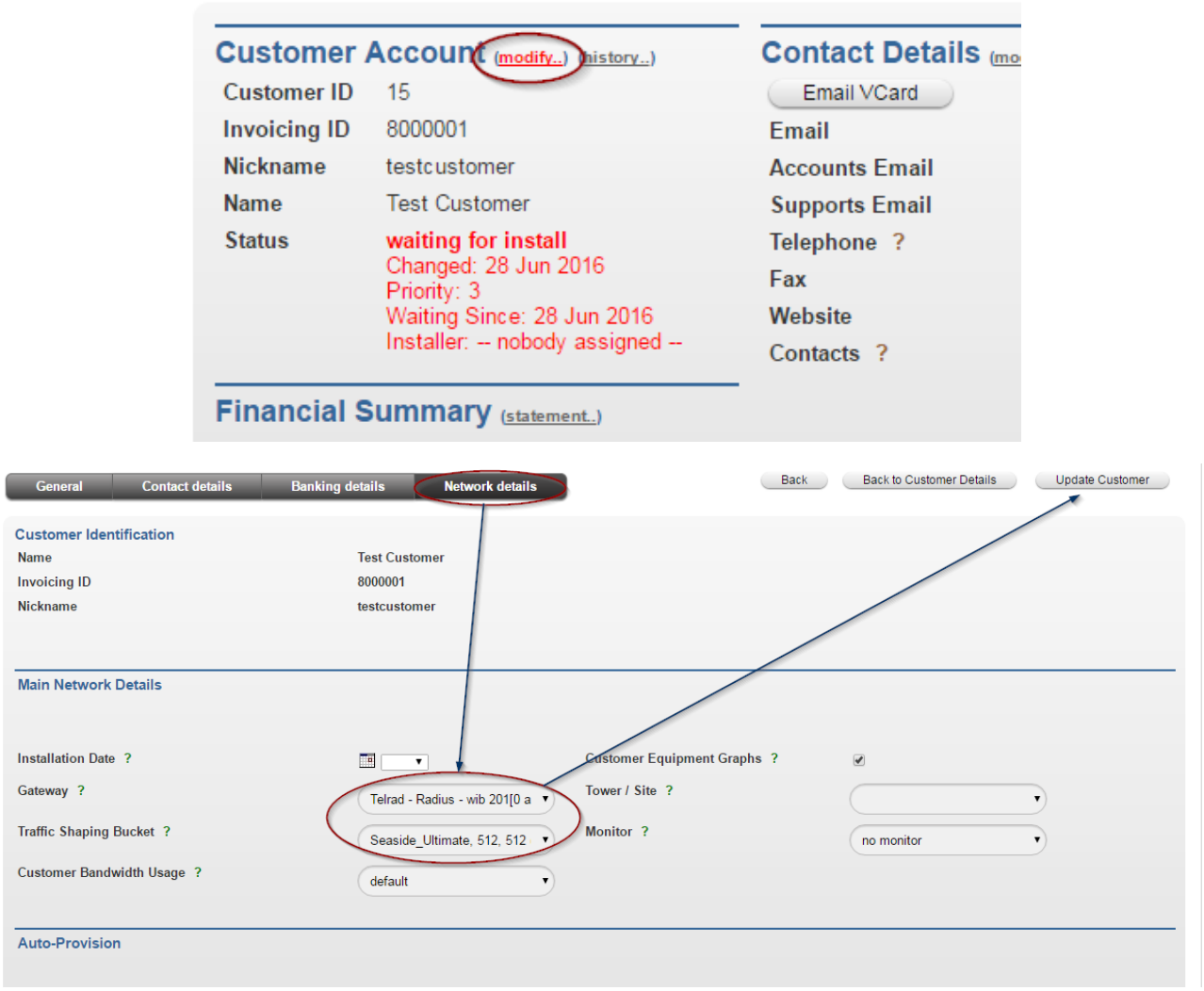


Fig. 3.3-1: Telrad – Radius Bucket

- **Step Two:** Once the customer gateway / bucket changes have been submitted, a RADIUS subsection (highlighted in green on the screenshot at fig. 3.3-2) will appear under the network details on customer details page. Next click on the 'modify' link next to the Equipment Details. This takes the operator to the customer equipment management page. (See Fig. 3.3-2)

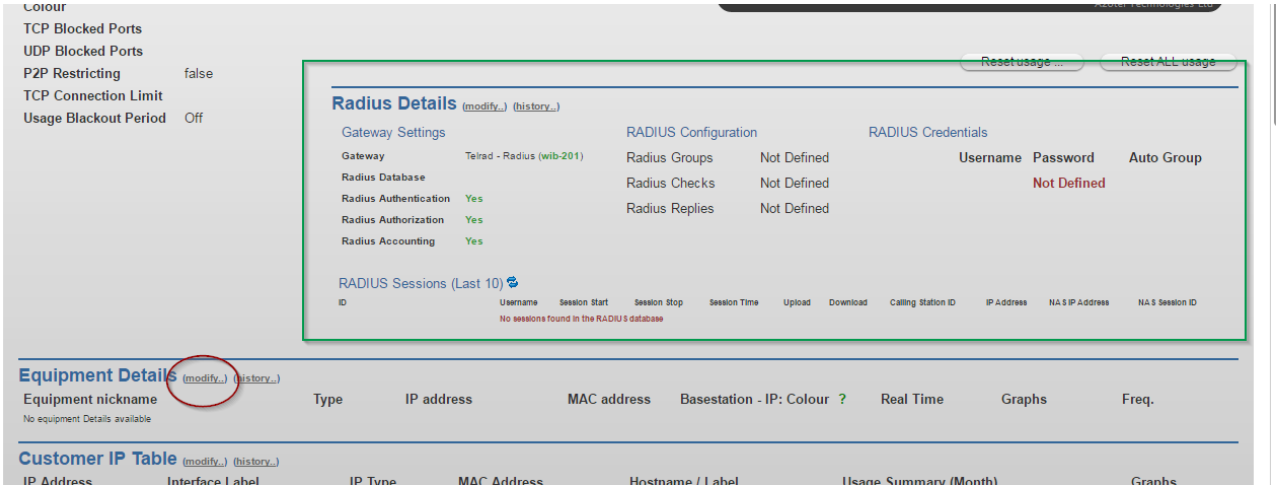


Fig. 3.3-2: Modify Equipment

- ***Step Three:*** Find both Telrad CPE and SIM Card that the respective customer is using and click on the 'Add' button next to them to add them to the customer assigned equipment. All equipment in "stock" will be available for selection here. (See Fig. 3.3-3).

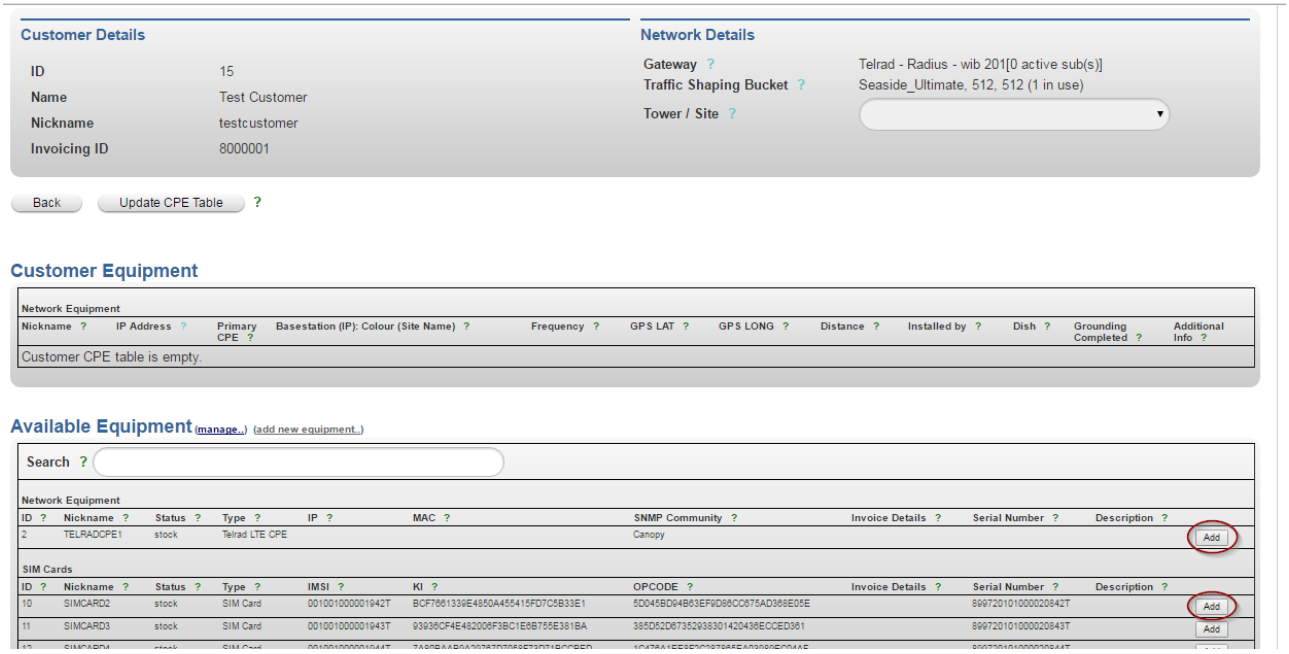


Fig. 3.3-3: Add Equipment

- ***Step Four:*** Once both the Telrad CPE and SIM Card have been added to 'Customer Equipment', choose the recently added Telrad CPE from the 'Equipment Attached to' dropdown in the SIM Cards section. This will tie the SIM Card to Telrad CPE and allow for some additional automatons to be set i.e. the IP address displayed under the customer equipment will be automatically updated based on the IP currently attached to the SIM Card. (See Fig. 3.3-4).

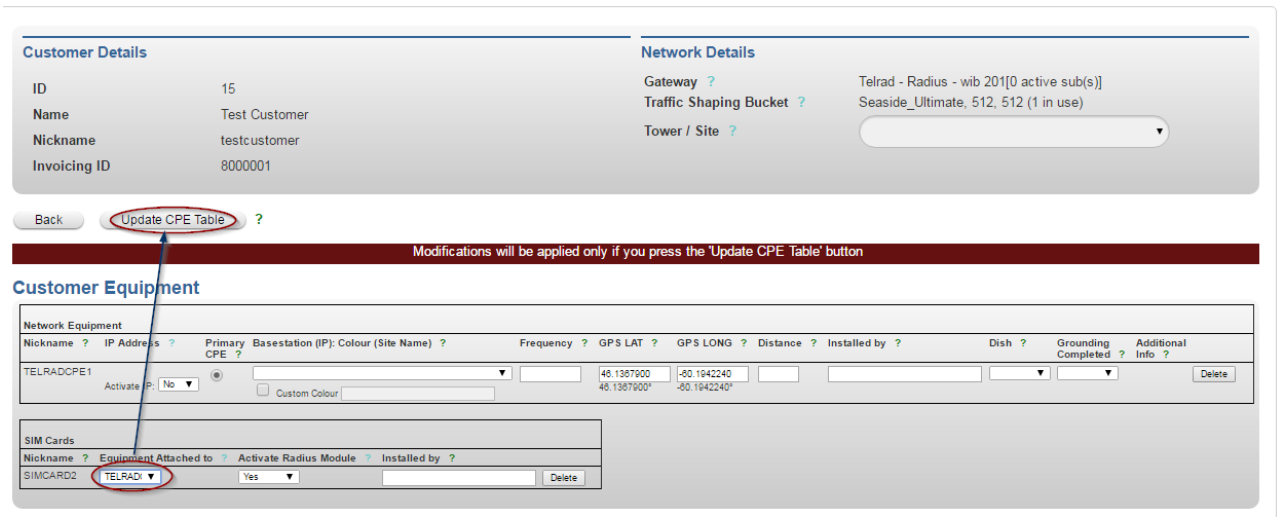


Fig. 3.3-4: Equipment Attachment

- ***Step Five:*** After the above step is completed, a RADIUS Details section will appear under customer details fully set with appropriate credentials (based on SIM Card IMSI attribute) as well as there will be two entries in the 'Equipment Details' table. (See Fig. 3.3-5).

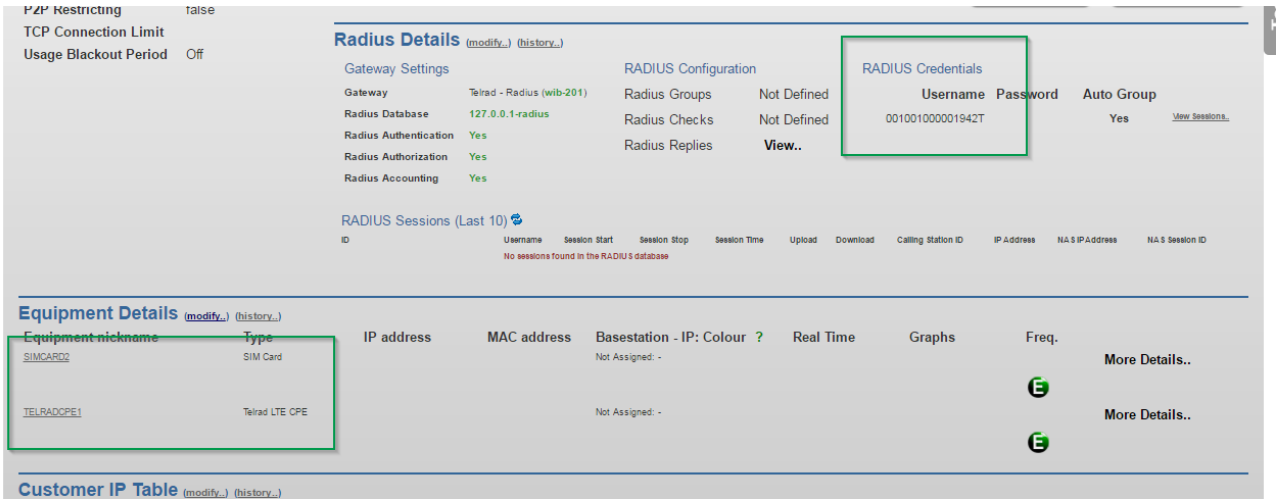


Fig. 3.3-5: RADIUS Credentials

- ***Step Six:*** The last step in the process of setting up a customer account is to add a static IP address to the customer account. Click on 'modify' button in the 'Customer IP Table' section of the Customer Details page. (See Fig. 3.3-6).

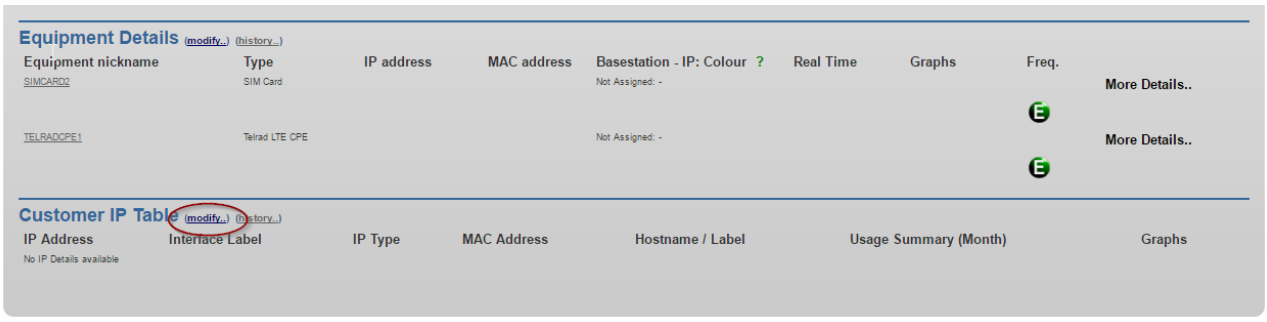


Fig. 3.3-6: Modify IP Address

- **Step Seven**: Generate the IP address from our pre-defined IP Pools, or Define the IP address manually. Select the IMSI on the SIM Card from the 'RADIUS Username' dropdown. This will ensure that the IP address will be allocated to the Telrad CPE via a RADIUS session off the Aradial Server. (See Fig. 3.3.-7).

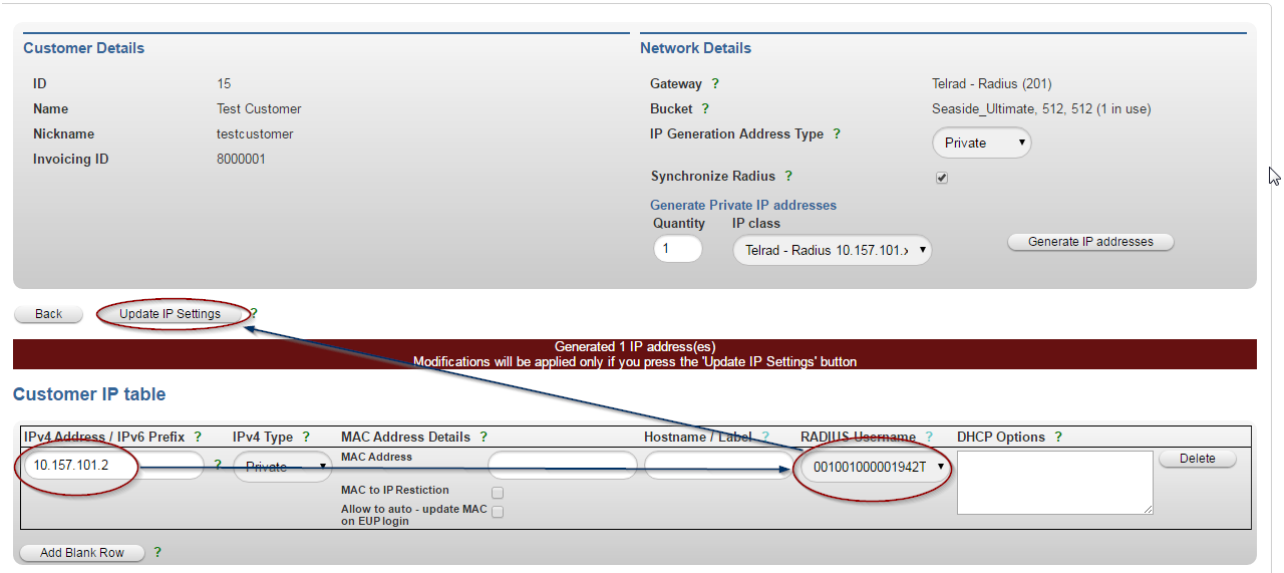


Fig. 3.3-7: Add IP Addresses

- Note that only 'current' customers will get access to the internet (and their CPE provisioned with the proper QoS as per the bucket). So it might make sense to change the customer account status to 'current' while installing. Aradial accounts for customers in any other state than 'current' will be put into a 'suspended' state at the Aradial server.

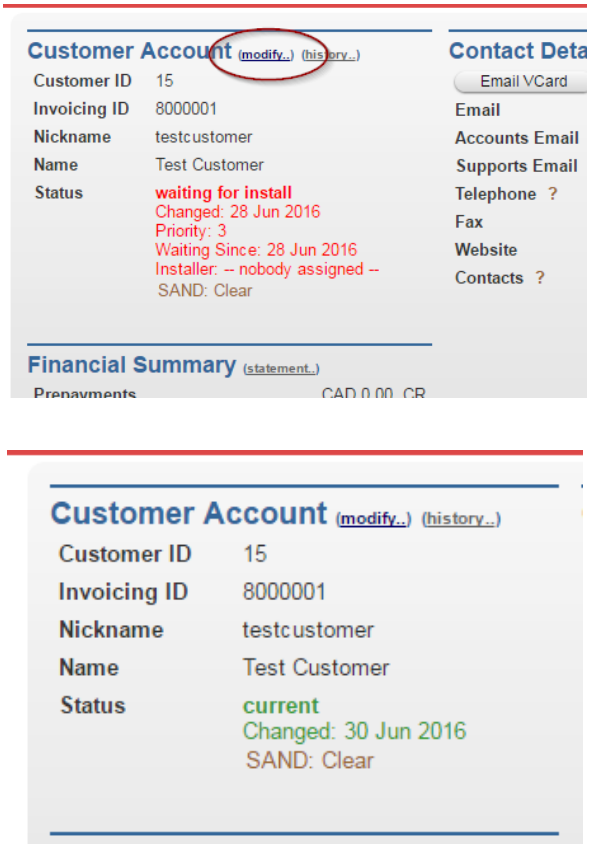


Fig. 3.3-8: Current Status

3.4 Import Sim Cards / Telrad equipment from CSV files

SIM Cards and Telrad gear, as well as any other piece of equipment, can be imported to the SIMPLer platform from CSV files using the ***'Import Data'*** tool. Use of the import tools has been well described under below entry of AzotelWiKi pages:

http://wiki.azotel.com/simpler-features/features-index-1/import-interface

Note: depending on the settings used in the API configuration, Sim Cards that have been imported can be activated in Telrad Aradial server typically with an *"Unprovisioned"* profile which can be very helpful in the installation process, where having pre-activated SIM-Cards can help the installer test the connection on the spot without any additional steps required to activate the connection.

For the benefit of this manual below please find the steps that outline the import process:

- ***Step One***: Click on the 'Import Data' button from the 'Settings' menu in SIMPLer. (See Fig. 3.4-1).

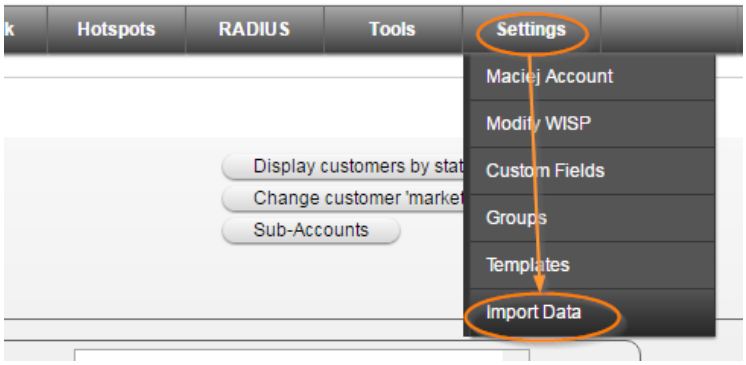


Fig. 3.4-1: Settings – Import Data

- ***Step Two:*** Pick the 'Equipment' option from the 'Table to be populated' dropdown menu. Submit your choice with the 'Load Interface' button. (See Fig. 3.4-2) This will bring up an interface dedicated to uploading Equipment positions to the SIMPLer platform.

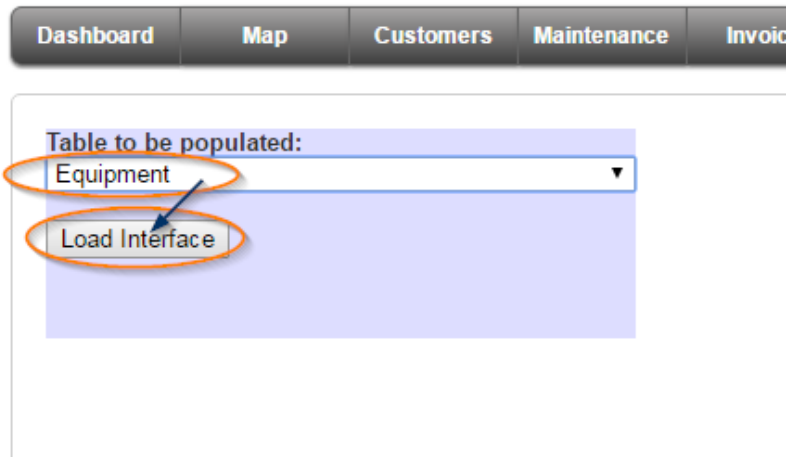


Fig. 3.4-2: Import Data - Equipment

- ***Step Three:*** Prepare the CSV file for upload. For SIM Cards used in the Telrad environment it should at least contain the following six columns:
  - **Nickname** - Unique equipment nickname - SIMPLer will not allow duplicates in this field. This must be in the first column of the imported file.
  - **IMSI** - International Mobile Subscriber Identity.
  - **KI** - Key (K) required for authentication.
  - **OPCODE** - OPc required for authentication.
  - **Type** - it should be set to 'SIM Card'.

- **Status** - It should be set to "stock" if you will need to re-assign these pieces of equipment to customers at a later date.

Nickname	IMSI	ICCID	PIN1	PUK1	ADM1	PIN2	K	OPc
SIMCARD1	001001000001941	8997201010000020841	1111	11111111	A519C1B6E3BBB4CA	2222	0D190F9F15714A536C121BDD95F5431C	63F62FB7C65A812A357F7A0C31
SIMCARD2	001001000001942	8997201010000020842	1111	11111111	00E0D655A3A9ECD8	2222	BCF7661339E4850A455415FD7C5B33E1	5D045BD94B63EF9D86CC675AD3
SIMCARD3	001001000001943	8997201010000020843	1111	11111111	29E0EA92E1774A9D	2222	93936CF4E482006F3BC1E6B755E381BA	385D52D673529383014204 36ECC
SIMCARD4	001001000001944	8997201010000020844	1111	11111111	2420E27CC918259C	2222	7A80BAAB9A29767D7058F73D71BCCBED	1C476A1EE8F2C287865EA03989E
SIMCARD5	001001000001945	8997201010000020845	1111	11111111	BCE4E88A047A54FC	2222	FB86D23094EECBDBD6CF83F371B1FC9C	C05097C1971A14B487CE88CBBD

Fig. 3.4-3: Example import Spreadsheet for SimCards

An example CSV file format can be found on the below screenshot (Fig. 3.4-4). To summarise, it must be comma separated with " used as a string delimiter.

```
"SIMCARD1","001001000001941","8997201010000020841","1111","11111111","A519C1B6E3BBB4CA","2222","0D190F9F15714A536C121BDD95F5431C","63F62FB7C65A812A357F7A0C311620F5","SIM Card"
"SIMCARD2","001001000001942","8997201010000020842","1111","11111111","00E0D655A3A9ECD8","2222","BCF7661339E4850A455415FD7C5B33E1","5D045BD94B63EF9D86CC675AD368E05E","SIM Card"
"SIMCARD3","001001000001943","8997201010000020843","1111","11111111","29E0EA92E1774A9D","2222","93936CF4E482006F3BC1E6B755E381BA","385D52D673529383014204 36ECCED361","SIM Card"
"SIMCARD4","001001000001944","8997201010000020844","1111","11111111","2420E27CC918259C","2222","7A80BAAB9A29767D7058F73D71BCCBED","1C476A1EE8F2C287865EA03989EC04AF","SIM Card"
"SIMCARD5","001001000001945","8997201010000020845","1111","11111111","BCE4E88A047A54FC","2222","FB86D23094EECBDBD6CF83F371B1FC9C","C05097C1971A14B487CE88CBBDB2998D","SIM Card"
```

Fig. 3.4-4: Example CSV

- ***Step Four:*** Once the CSV file is prepared, columns reflecting the file format should be chosen by double clicking the field name in the left-hand column, you will transfer it to the right-hand column, which represents the fields that will be imported, then select the file to upload and finally click on the 'Upload File' button to start importing process. (See Fig. 3.4-5).

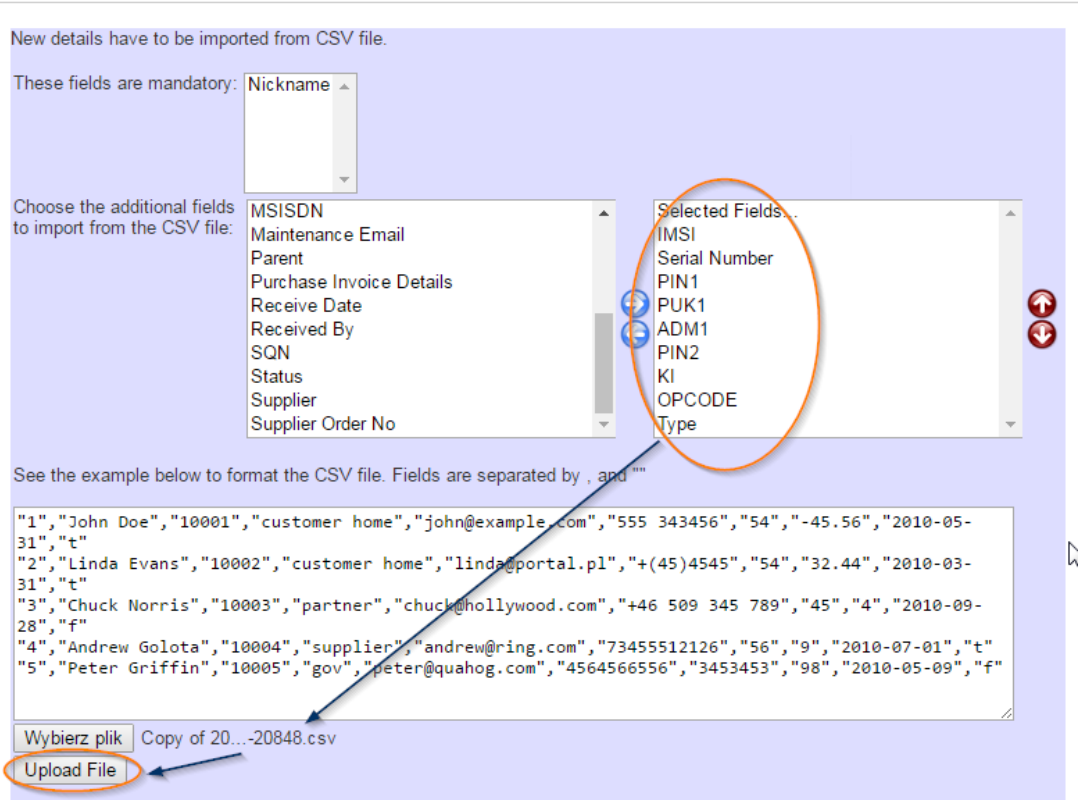


Fig. 3.4-5: Upload File Process

- ***Step Five:*** This will bring a page where data from the uploaded file is interpreted. Any errors will be highlighted and must be corrected before SIMPLer will allow the data set to be imported. Click the 'IMPORT' button once the data set has been reviewed. (See Fig. 3.4-6).

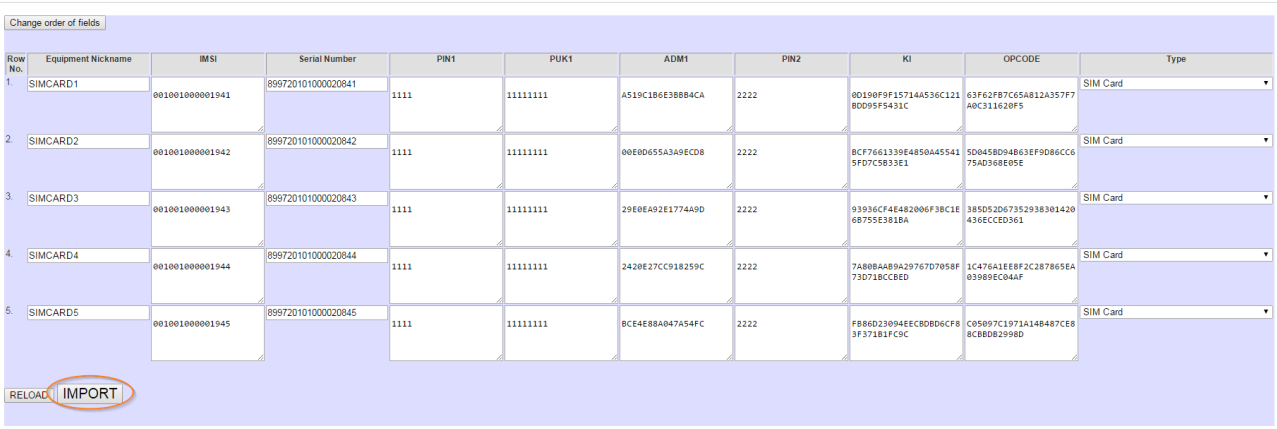


Fig. 3.4-6: File Review and Import

3.5 Add Sim Cards / Telrad CPE Manually

SIM Cards, Telrad CPE LTE as well as any other equipment can also be added to the SIMPLer platform manually. Following below steps to add a Sim Card to SIMPLer platform – note that pretty much same steps apply to Telrad LTE CPE:

- ***Step One***: Click on ***'Equipment Details'*** from the ***'Network'*** submenu to navigate the equipment page that lists all equipment available in the operator instance. There click on the ***'Add'*** button. Alternatively you can directly click on the ***'Add New Equipment'*** option from the ***'Network'*** submenu. (See Fig. 3.5-1).

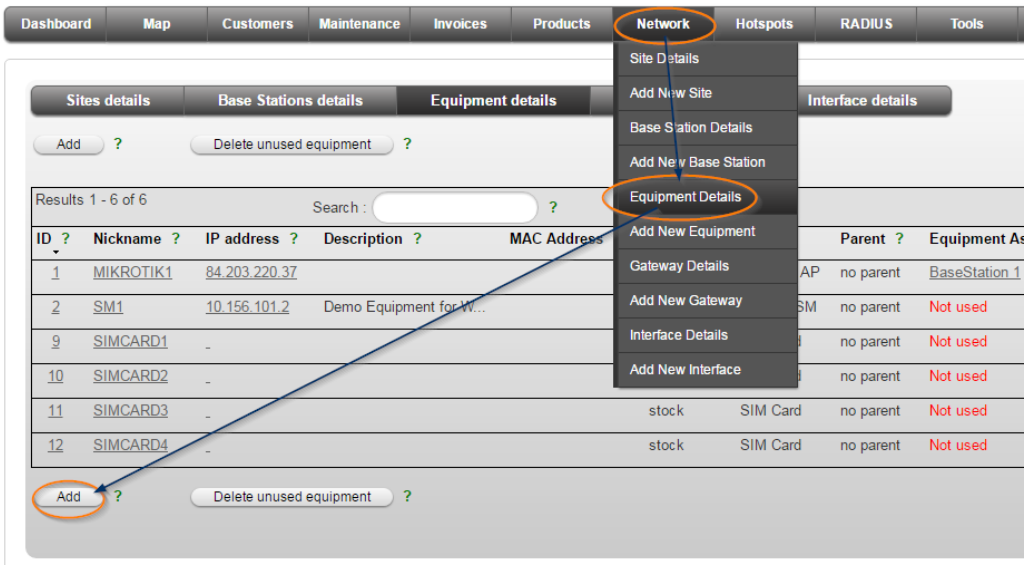


Fig. 3.5-1: File Review and Import

- ***Step Two:*** Fill out the new SIM Card details. Make sure to use ***'SIM Card'*** as the ***'Type'***. This will enable additional, sim card related details section where the IMSI, KI, and OPCODE can be filled out. The type should also be set as ***"stock"*** because this will make it available for selection once you are ready to assign it to a customer. Once done editing simcard attributes click on the ***'Add'*** button. (See Fig. 3.5-2).

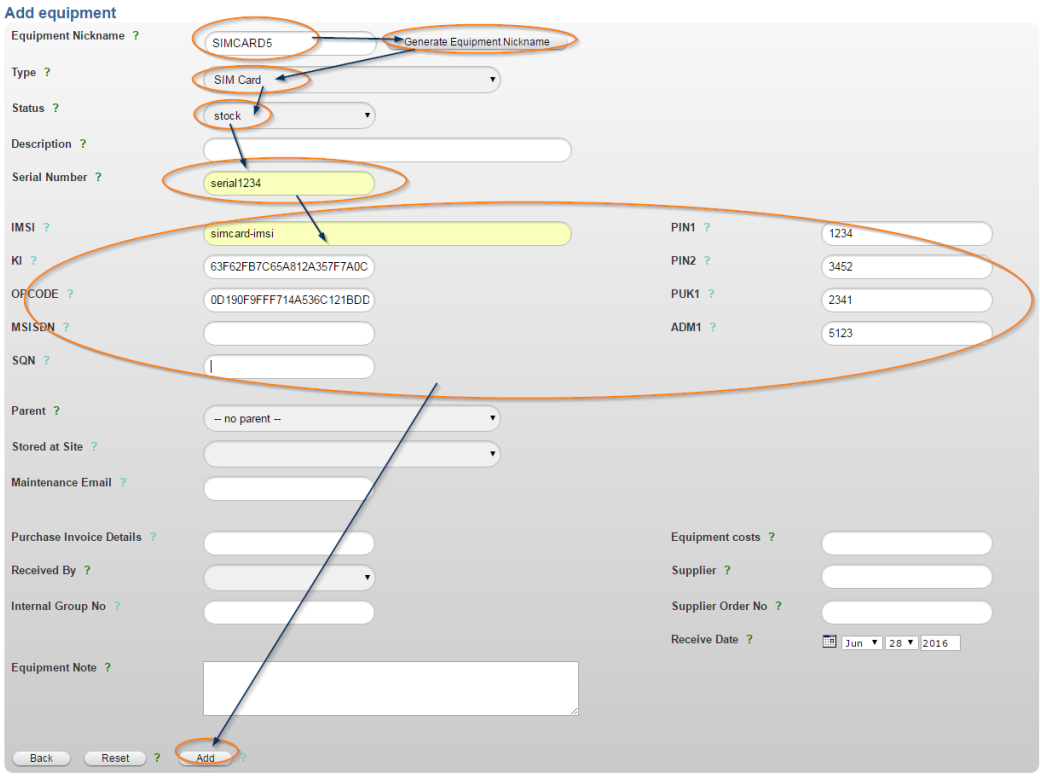


Fig. 3.5-2: Add Sim Card

3.6 Map Telrad / Aradial Group to SIMPLer Bucket

SimCard profiles in Telrad require being assigned to a group that defines all aspects of customer connection attributes i.e. quality of service details, static/dynamic IP assignement etc. Each production used group that has been set under Telrad's Aradial must be mapped to a respective bucket in the SIMPLer platform under every operator instance that is interfacing with a particular Aradial server. Below are the steps that outline how to do so:

- ***Step One:*** Navigate to ***'RADIUS'*** server tab in SIMPLer platform than click on ***'Group Reply'*** button from the left side menu. (See Fig. 3.6-1).

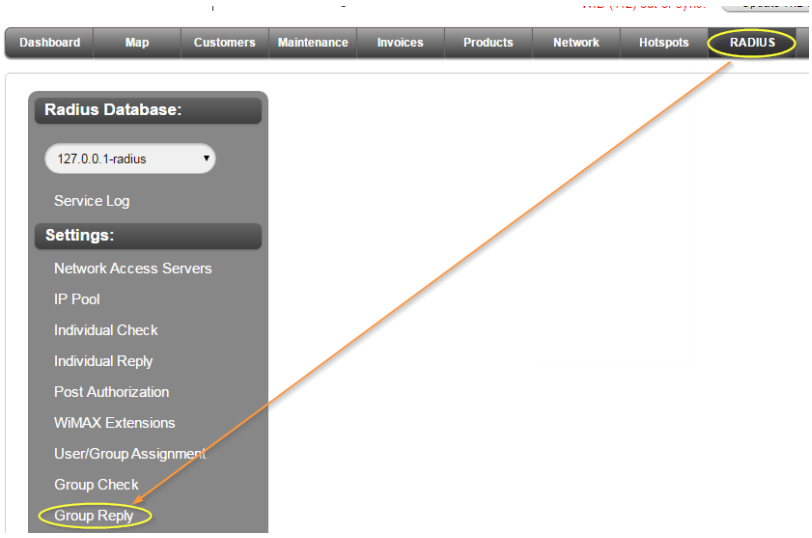


Fig. 3.6-1: RADIUS Group Reply

- ***Step Two***: Review the group names found on the RADIUS Group Reply page and check if your new group is missing from it. Note that each group name from Telrad's Aradial will automatically be prefixed with operator instance name followed by a underscore (i.e. operator_). If your group is missing - do click on the ***'Add'*** button. (See Fig. 3.6-2).

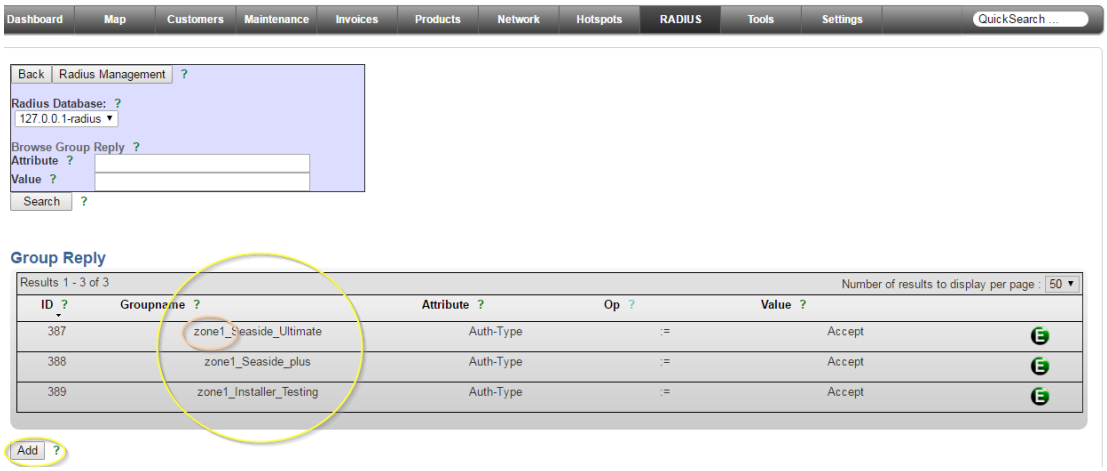


Fig. 3.6-2: Add RADIUS Group

- ***Step Three:*** On the ***'Add Group Radius Reply'*** page click on ***'Define new Group'*** radio button, then fill out the group name field exactly with a group name as per Aradial requirements, make sure that ***'FreeRADIUS-Internal'*** dictionary is set. Pick the ***'Acct-Type'*** from Attribute dropdown, ***':='*** option from ***'Op'*** dropdown and fill out ***'Value'*** field with ***'Accept'***. Verify the form and than click ***'Add'*** to confirm adding a new group. (See Fig. 3.6-3).

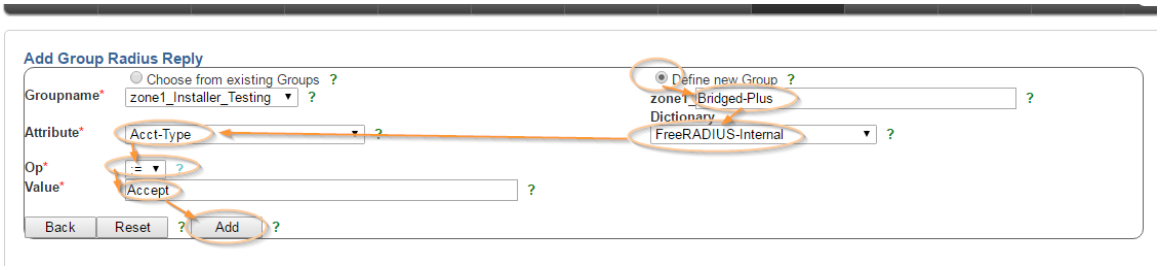


Fig. 3.6-3: Define RADIUS Group Reply

- ***Step Four:*** Verify the new Radius Group has been added (see Fig, 3.6-4).

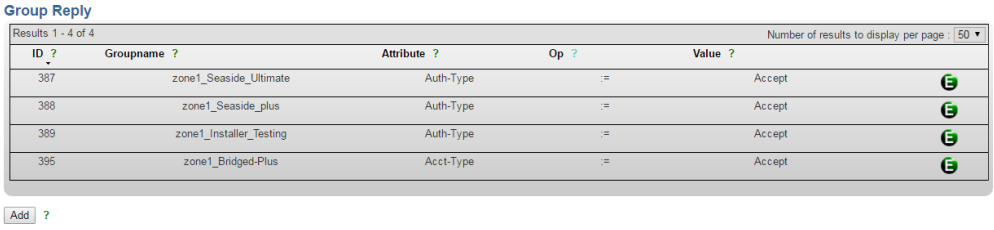


Fig. 3.6-4: Group Verification

- ***Step Five:*** To complete mapping of the RADIUS group to a gateway bucket, please navigate to the ***'Gateway Details'*** page from the ***'Network'*** popup menu. Then click on the blue ***'B'*** button to get to the buckets page of the 'Telrad - Radius' gateway. (See Fig. 3.6-5).

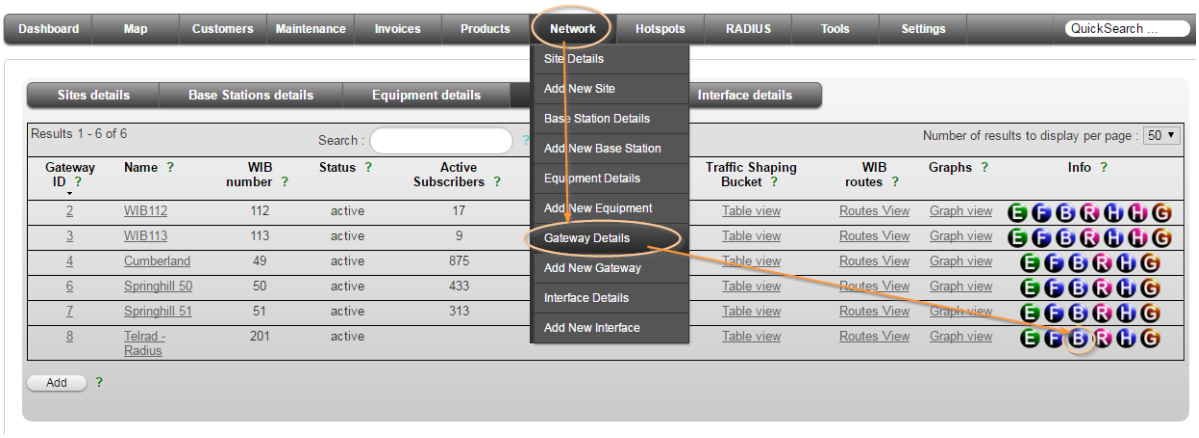


Fig. 3.6-5: Bucket Definition

- ***Step Six:*** Fill out new bucket details. It is a good practice to use the Group name as a bucket name for easy mapping. That being said it is not mandatory. Fill out Downlink / Uplink details. These fields are informational and will not used by the Aradial integration. That being said it is best to fill them out as accurately as possible, so that CSR's know what speeds customers can expect. Click on the ***'Add'*** button to confirm adding new bucket then click on ***'Update Buckets Table'***. (See Fig. 3.6-6).

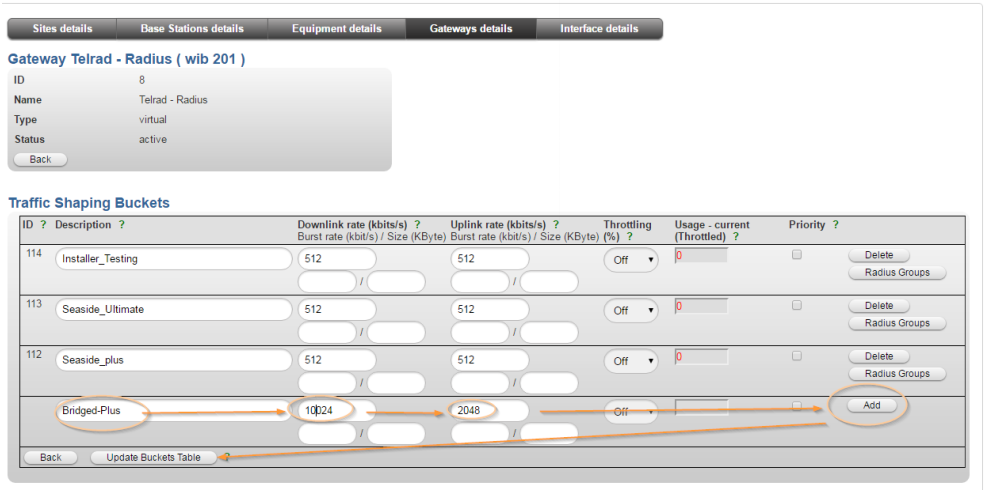


Fig. 3.6-6: Bucket Settings

- ***Step Seven:*** Navigate back to buckets page by clicking ***'Modify Buckets'*** button. (See Fig. 3.6-7).

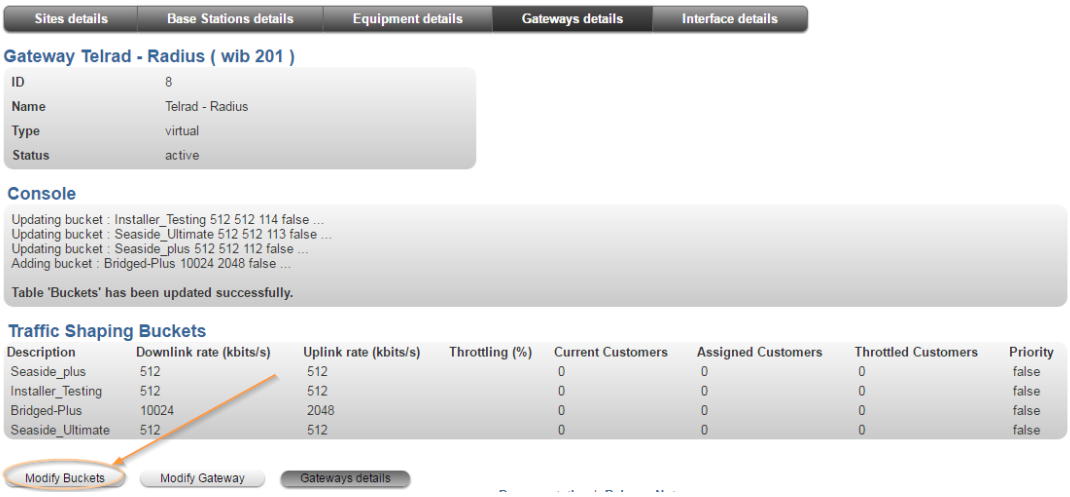


Fig. 3.6-7: Modify Buckets

- ***Step Eight***: Click on 'Radius Groups' button for the recently added bucket. (See Fig. 3.6-8).

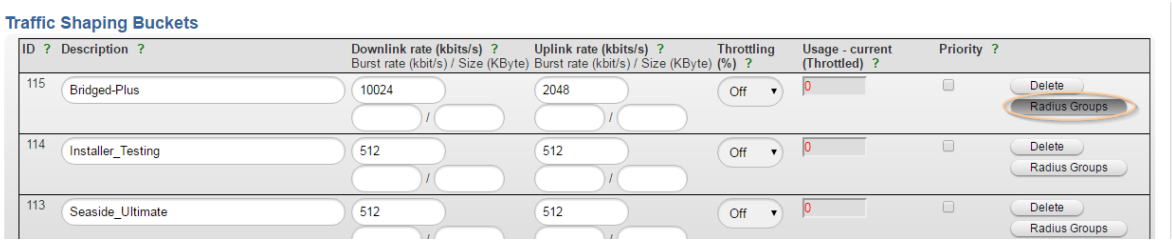


Fig. 3.6-8: RADIUS Groups Button

- ***Step Nine:*** In the console window please Click on the ***'Add'*** button. (See Fig. 3.6-9).

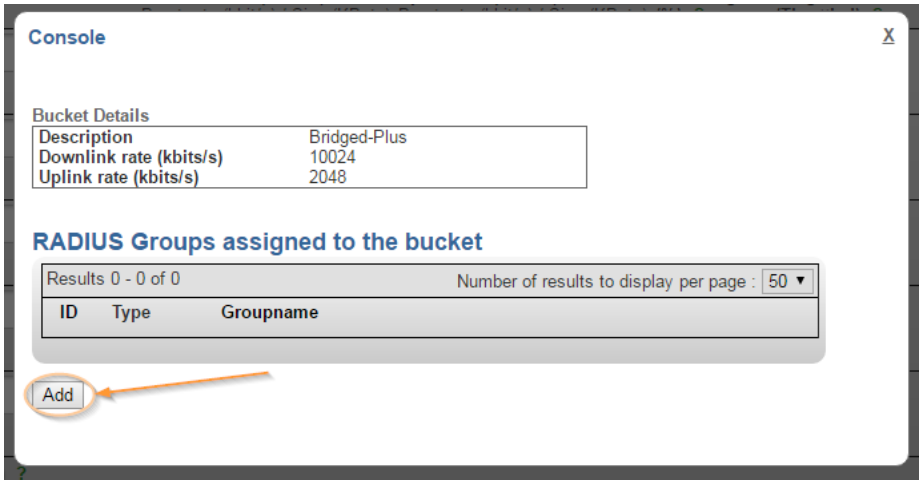


Fig. 3.6-9: Add RADIUS Groups to Bucket

- ***Step Ten:*** Pick the recently added RADIUS group name from dropdown, make sure that ***'Current'*** is set as the type and click on ***'Add'***. (See Fig. 3.6-10).

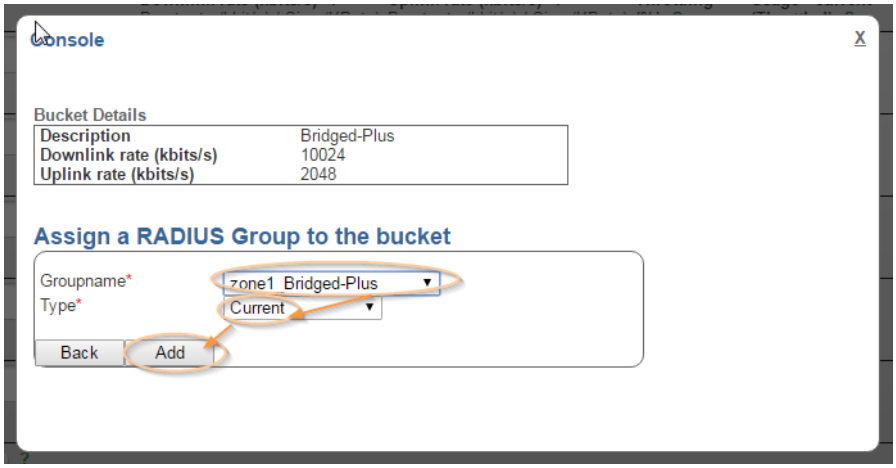


Fig. 3.6-10: Add RADIUS Group

- ***Step Twelve:*** Verify that the RADIUS group for current type assignment is listed on the summary window. This concludes the setup. (See Fig. 3.6-11).

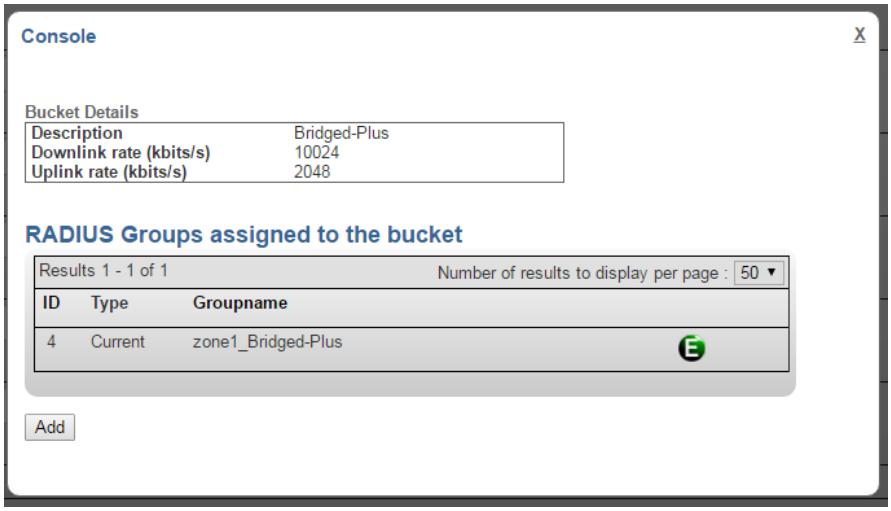


Fig. 3.6-11: Group Verification

4 ClearCable Integration

4.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and ClearCable NOMS server for VoIP deployments.

Any ClearCable VoIP service managed from NOMS server can now be integrated with Azotel SIMPLer platform. SIMPLer can synchronize customer accounts and their respective equipment using NOMS API. NOMS platform is than used by VoIP server to authenticate SIP clients / authorise SIP services on Telrad LTE CPE gear.

Once customer accounts are synchronized, the operator needs to set under the NOMS platform all relevant VoIP details such as for example:

- phone number.
- VoIP package.
- 911 settings.

The SIMPLer platform will can also collect call detail records (CDR's) from NOMS server on a monthly basis and create invoices based off these.

4.2 ClearCable NOMS trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

Before setting up ClearCable NOMS API the below access details must be obtained from ClearCable:

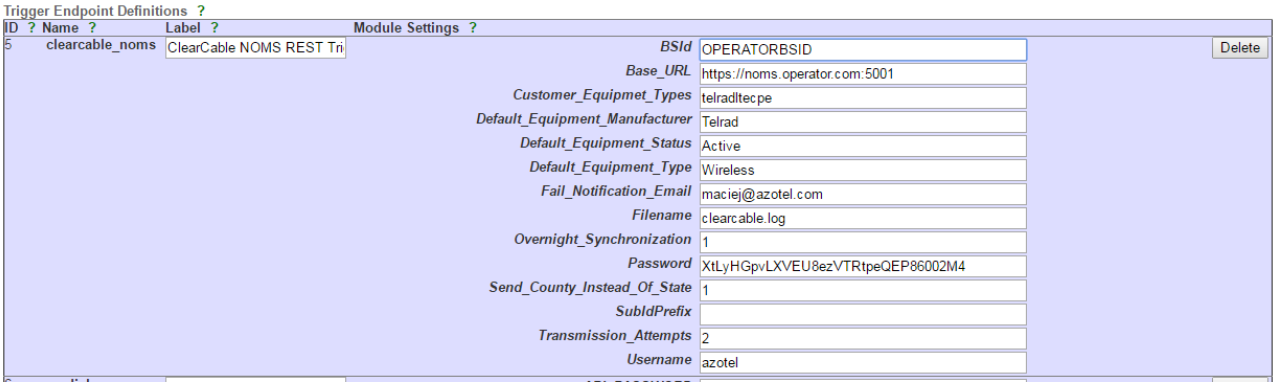
- ***Base URL***: this is the API URL that will be used by SIMPLer to communicate with i.e. http://noms.operator.com:5001
- ***Username*** : Username SIMPLer platform should send to authenticate with API.
- ***Password*** : Password related to the Username.
- ***BSId*** : Business ID

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module.

- ***Customer_Equipment_Types*** : this field specifies which SIMPLer equipment types should get synchronized to NOMS. By default this is set to *'telradcpelte'*
- ***Default_Equipment_Manufacturer:*** defines what manufacturer shall be sent for each equipment synchronized. Unless otherwise instructed use *'Telrad'*
- ***Default_Equipment_Status:*** defines the status that is synchronized for each new equipment added to a customer account in SIMPLer and pushed through API for the first time. Unless otherwise instructed use *'Active'*.
- ***Default_Equipment_Type:*** defines the default equipment type that will be applied to each synchronized equipment. Unless otherwise instructed use *'Wireless'*.
- ***Fail_Notification_Email:*** email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent.
- ***Filename:*** name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization:*** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Telrad RADIUS server. This is option is not recommended to use unless there are multiple communication issues between SIMPLer and Aradial server

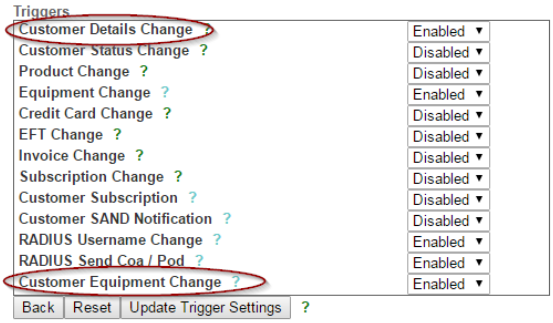
- ***Send_County_Instead_Of_State:*** SIMPLer will submit the county from customer address instead of state via NOMS API if set to "1". As in many countries 'states' do not exist – this might help to push something useful from customer details to Clearcable.
- ***SubIdPrefix:*** if multiple operator instances are synchronizing to the same BSId in one NOMS platform – this field can be used to add a dedicated prefix to each customerid and by doing so – ensure that customerid's synchronized from SIMPLer will remain unique. By default this field should be empty.
- ***Transmission_Attempts:*** specifies how many times system should retry submitting updates via API upon communication failures. Should be populated with a number. It is set to 2 by default.



4.2-1 Example ClearCable API configuration entry

The Clearcable API requires triggers shown on the below screenshot to be enabled as a part of configuration process:

- ***Customer Details Change*** – enabling this trigger is required to synchronize customer accounts
- ***Customer Equipment Change*** – enabling this trigger is required to synchronize equipment assigned to customers (Telrad CPE LTE for example). Synchronized equipment can be used by ClearCable NOMS to provision SIP clients automatically on the CPE units.



4.2-2 ClearCable API triggers

4.3 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Customer Details*** – basic customer details should be filled out as this data is being pushed to NOMS server i.e. nickname, invocingid, name, address
- ***Telrad CPE LTE*** – SimCard should be assigned to this Telrad CPE – which will enable the synchronization module.

Once the above conditions are met, the account from SIMPLer should be synchronized to the Clearcable server.

Below please find the steps required to set up a customer account in SIMPLer with a SIM Card and a Telrad CPE:

- **Step One:** Add a customer account to SIMPLer
- ***Step Two:*** Under the "equipment details" section, find the Telrad CPE that the respective customer is using and click on the 'Add' button next to it to add to the customer assigned equipment table. All equipment in "stock" will be available for selection here. (See Fig. 4.3-1). Click "update CPE table" to register the update.

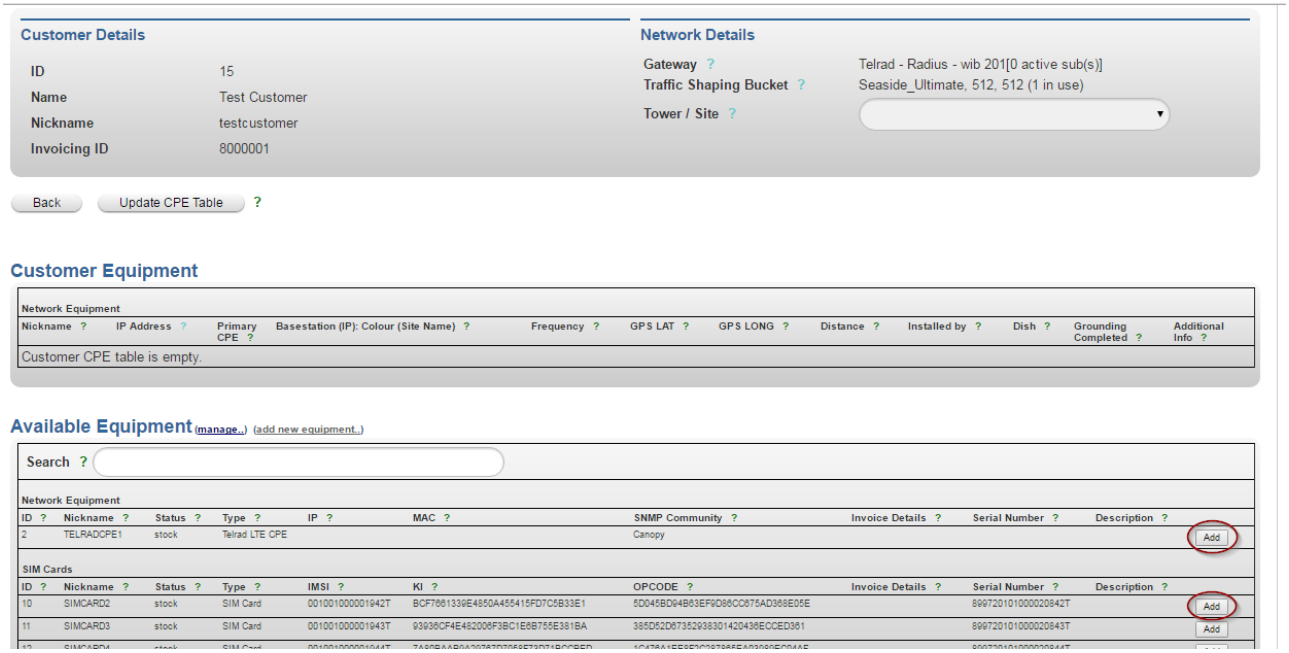


Fig. 4.3-1: Add Equipment

4.4 Customer Account preview in NOMS

A customer account with Telrad equipment will be created in NOMS after completing two steps outlined in the previous chapter. It can be searched in NOMS using nickname, username, name and customerid. Example account synchronized from SIMPLer server to NOMS looks as per Fig. 4.4-1.

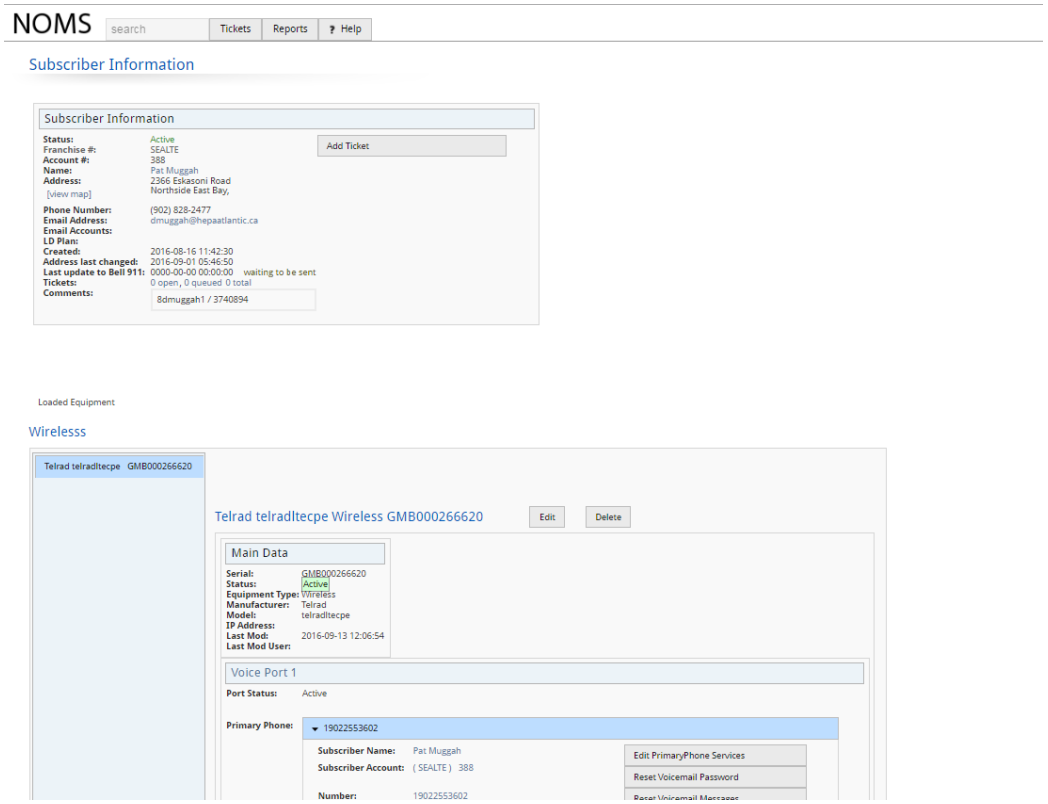


Fig. 4.4-1: Example customer account in NOMS platform

5 Generic JSON/REST

5.1 Introduction

JSON/REST is the generic interface that can be used by operators to integrate other platforms with SIMPLer where information must be synchronized 'live', exactly at the time when it is being changed in SIMPLer or where for any reason working with SIMPLer API is more complicated than deploying a receiving JSON/REST endpoint.

Upon being triggered SIMPLer will send respective JSON/REST messages to specified endpoints. Each integrated platform will need to implement an endpoint that will interpret the incoming messages and apply respective changes as required for a particular integration.

5.2 JSON/REST endpoint setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

- **Password** – remote endpoint authentication password.
- **Username** – remote endpoint authentication username.

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module.

- **Base_URL** - common part of each trigger endpoint URL addresses can be defined here. It is best to use this field to simplify the setup if all JSON/REST messages are sent to one host. If this field is left empty, full URL addresses must be defined under endpoint related fields
- **Creditcard_change_Endpoint** – URL address where Credit Card record details will be sent upon change in SIMPLer platform. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Credit Card messages will be sent if this field is left empty
- **Customer_details_change_endpo1int** - URL address where Customer record details will be sent upon any change made to the customer in SIMPLer. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Customer Details messages will be sent if this field is left empty.
- **Customer_sand_notification_Endpoint** - URL address where Customer SAND notification details will be sent upon SIMPLer changing customer SAND status. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Customer SAND Notification messages will be sent if this field is left empty.
- **Customer_status_change_endpoint** - URL address where Customer status details will be sent upon any change in SIMPLer. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Customer Status messages will be sent if this field is left empty.
- **Customer_subscriptions_Endpoint** - URL address where all Customer Subscriptions will be sent upon any modification made to a single subscription assigned to a customer account. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Customer Subscription messages will be sent if this field is left empty.
- **EFT_account_change_Endpoint** - URL address where EFT Account details will be sent upon any modification made to the EFT account in SIMPLer. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No EFT account messages will be sent if this field is left empty.
- **Invoice_change_Endpoint** - URL address where Invoice details will be sent upon any change made to an invoice record in SIMPLer. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Invoice messages will be sent if this field is left empty.
- **Product_change_Endpoint** - URL address where Product details will be sent upon any change to a product record in SIMPLer. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Product messages will be sent if this field is left empty.
- **Subscription_change_Endpoint** - URL address where a single Subscription details will be sent upon any changes made to the respective record in SIMPLer. If Base_URL is defined, this field should only contain the suffix to the Base_URL. No Subscription messages will be sent if this field is left empty.

- **Fail_Notification_Email** - a notification email will be sent to an email address specified in this attribute if for any reason SIMPLer will fail to send a JSON/REST message.
- **Transaction_Attempts** - this field defines how many times should SIMPLer try to re-send the JSON message to remote API if transaction was not successful.

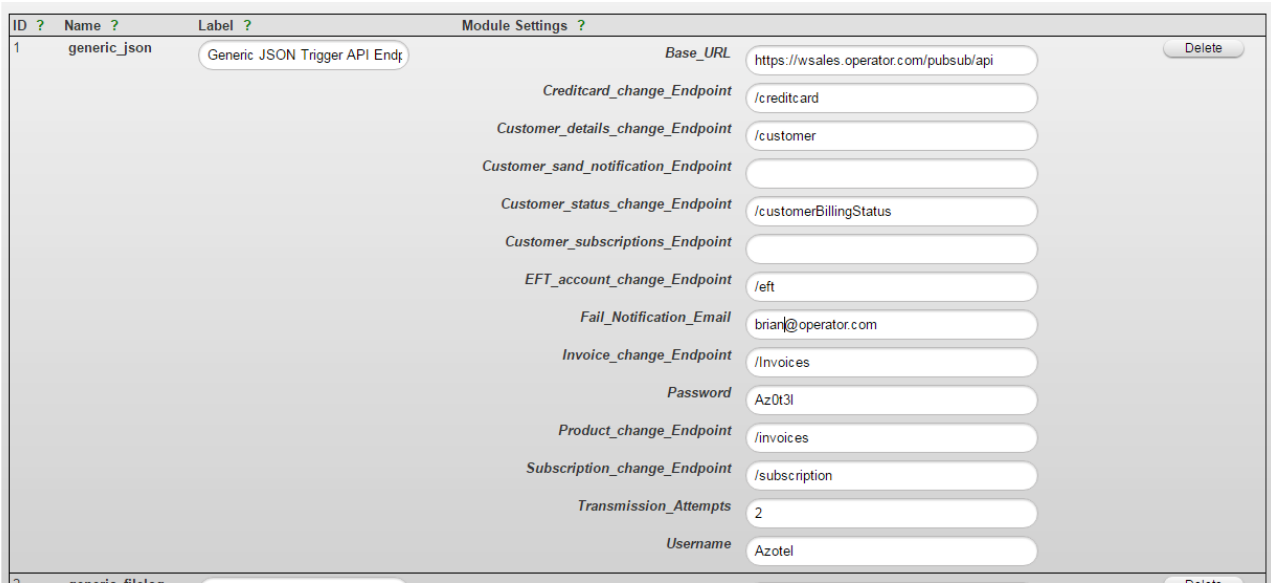


Fig. 5.2-1: Example JSON/REST endpoint configuration

5.3 REST/JSON examples

Below find REST/JSON messages output examples. Note that these are a subject to change and more fields may appear in the actual messages as SIMPLer is constantly growing. Above being said we will keep the existing layout an only add to it, to make sure that the backwards compatibility is always adhered to.

5.3.1 Customer Details Change

```
{
          'install_street2' => undef,
          'town' => 'Pogwizdow',
          'install_postcode' => undef,
          'state' => 'Alaska',
          'email' => 'maciej.gawlowski@gmail.com',
          'communitycode' => undef,
          'install_county' => undef,
          'initial_contact_date' => '2012-05-26',
          'macaddresses' => [
                    '00-20-D6-CC-D5-29',
                    '00:15:6D:93:47:6F',
                    '00-20-D6-DC-31-E8'
          ],
          'installation_date' => '2012-05-27',
          'customerstatus' => 'current',
          'OPERATOR' => 'testss',
          'name' => 'Maciej Gawlowski',
          'macaddress' => '00-20-D6-CC-D5-29,00:15:6D:93:47:6F,00-20-D6-DC-31-E8',
          'street2' => 'I tyle',
          'customerid' => '27737',
          'county' => 'Idaho',
          'customer_name' => 'Maciej Gawlowski',
          'ID' => '1',
          'Triggers' => '',
          'LABEL' => 'Generic Filelog',
          'ipaddresses' => [
                    '192.168.106.94',
                    '10.32.124.25',
                    '192.168.106.179'
          ],
          'start_date' => '2012-11-05',
          'postcode' => '83501',
          'NAME' => 'generic_filelog',
          'nickname' => 'te18252',
          'Filename' => 'logfile.log',
          'LogType' => 'customer_details_change',
          'phone' => '606473915',
          'street1' => 'Cieszynska 1461',
          'install_state' => undef,
          'install_street1' => undef,
          'action' => 'update',
          'install_town' => undef,
          'ipaddress' => '192.168.106.94,10.32.124.25,192.168.106.179'
};
```

5.3.2 Customer Status Change

```
{
          'ID' => '1',
          'Triggers' => '',
          'status_assigned' => '',
          'LABEL' => 'Generic Filelog',
          'status' => 'current',
          'status_reason' => '',
          'status_notes' => '',
          'isDeliquent' => 0,
          'status_date' => '',
          'NAME' => 'generic_filelog',
          'nickname' => 'te18252',
          'OPERATOR' => 'testss',
          'Filename' => 'logfile.log',
          'name' => 'Maciej Gawlowski',
          'LogType' => 'customer_status_change',
          'customerid' => '27737',
          'action' => 'update'
};
```

5.3.3 Product Change

```
{
          'non_prorating' => '0',
          'tax_mode' => 'fixed',
          'eup_product_tied' => undef,
          'formula' => undef,
          'dynamic_product_tied' => undef,
          'tax_zipcode' => undef,
          'traffic_limit_exempted' => undef,
          'traffic_limit' => '5',
          'code' => 'BBGOLD',
          'time_excluded' => '{}',
          'OPERATOR' => 'testss',
          'description' => 'Broadband Gold',
          'tax_rate' => '10.900',
          'tax_zone' => undef,
          'tax_flat_rate' => undef,
          'type' => undef,
          'ID' => '1',
          'free_service' => 'No',
          'Triggers' => '',
          'status' => undef,
          'valid_from' => undef,
          'LABEL' => 'Generic Filelog',
          'eup_description' => undef,
          'round' => 'aritmethic',
          'product_type' => undef,
          'eup_available' => '0',
          'deffered' => '0',
          'valid_to' => undef,
          'NAME' => 'generic_filelog',
          'Filename' => 'logfile.log',
          'cycles' => undef,
          'LogType' => 'product_change',
          'tax_zone_group' => undef,
          'action' => 'update',
          'nominal' => undef,
          'productprice' => '50.00000',
          'productid' => '54'
 };
```

5.3.4 Credit Card Change

```
{
          'ID' => '1',
          'cc_id' => '7441',
          'Triggers' => '',
          'LABEL' => 'Generic Filelog',
          'cc_holder' => 'Maciej Gawłowski',
          'failed_payment_counter' => '0',
          'cc_address' => '{"Cieszyńska 146","",Pogwizdów,"",43-418,Alabama,Poland,Maciej,Gawłowski}',
          'NAME' => 'generic_filelog',
          'cc_last4' => '4321',
          'autobilling' => '0',
          'Filename' => 'logfile.log',
          'OPERATOR' => 'testss',
          'cc_preferred' => '1',
          'LogType' => 'creditcard_change',
          'cc_type' => 'other',
          'cc_year' => '2019',
          'cc_token_date' => undef,
          'action' => 'update',
          'customerid' => '27737',
          'cc_token' => undef,
          'cc_month' => '01'
 };
```

5.3.5 EFT Change

```
{
          'ID' => '1',
          'eft_autopayment' => '0',
          'eft_sepa_signaturedate' => '',
          'Triggers' => '',
          'LABEL' => 'Generic Filelog',
          'eft_banksortcode' => '235162351w',
          'eft_sepa_debtorremittancedata' => 'Remitance',
          'eft_sepa_country' => 'ie',
```

```
          'eft_sepa_bic' => '21433433w',
          'eft_sepa_iban' => 'PL07105010831000002312394014',
          'eft_sepa_sequencetype_original' => undef,
          'eft_iban' => 'PL07105010831000002312394014',
          'eft_preferred' => '0',
          'eft_bankonlineref' => '3453245234523455w',
          'NAME' => 'generic_filelog',
          'eft_id' => '65',
          'Filename' => 'logfile.log',
          'OPERATOR' => 'testss',
          'eft_last4' => undef,
          'eft_bankaccounttype' => 'checking',
          'LogType' => 'eft_change',
          'eft_sepa_sequencetype' => 'FRST',
          'eft_bankaccountnumber' => '898989898934',
          'eft_sepa_debtorname' => '21433433w',
          'customerid' => '27737',
          'eft_bankaccountname' => 'w234234',
          'action' => 'update',
          'eft_bankdetailschanged' => undef,
          'eft_cajamar_iban' => undef
 };
```

5.3.6 Invoice Change

```
{
          'ID' => '1',
          'eft_once_off' => undef,
          'paymentstatus' => 'failed',
          'Triggers' => '',
          'LABEL' => 'Generic Filelog',
          'invoiceid' => '171',
          'automated' => '1',
          'sageinvid' => '171',
          'reference' => 'A76 [436]',
          'billingperiod_startdate' => '2015-04-07',
          'setup_rate' => undef,
          'postmethod' => 'custom',
          'NAME' => 'generic_filelog',
          'Filename' => 'logfile.log',
          'OPERATOR' => 'testss',
          'posteddate' => '2015-04-07',
          'eft_reference' => '8989898989',
          'invoicedate' => '2015-04-07',
          'LogType' => 'invoice_change',
          'invoiceperiod' => '1',
          'vat_rate' => '-1',
          'amount' => '1488.30',
          'filename' => 'te18252_2015-04-07_171_001.pdf',
          'prorated' => undef,
          'customerid' => '27737',
          'action' => 'update',
          'tax_flat_rate' => undef,
          'paymentdate' => undef
 };
```

5.3.7 Subscription Change

```
{
          'overageid' => undef,
          'priority' => '5',
          'overage' => undef,
          'tax_mode' => undef,
          'frequency' => undef,
          'formula' => undef,
          'subaccount_customerid' => undef,
          'OPERATOR' => 'test',
          'discount' => '0.00',
          'description' => undef,
          'tax_rate' => undef,
          'tax_zone' => undef,
          'premium' => '0.00',
          'customerid' => '11020',
          'type' => undef,
          'price' => '-101.00',
          'tax_flat_rate' => undef,
          'ID' => '1',
          'free_service' => 'Yes',
          'Triggers' => 'customer_details_change',
          'LABEL' => 'Generic Filelog',
          'valid_from' => '2016-06-14',
          'round' => 'product default',
          'timestamp' => '2016-09-15 11:46:33.364615',
          'valid_to' => '2016-10-14',
          'NAME' => 'generic_filelog',
          'Filename' => 'logfile.log',
          'quantity' => '1',
          'cycles' => '1',
          'LogType' => 'subscription_change',
          'subscriptionid' => '1311',
          'action' => 'new',
          'productid' => '32'
}
```

5.3.8 Customer Subscriptions

```
{
          'operator' => 'testss',

          'customerid' => '27882'
          'customername' => 'SJS7175',
          'customerinvoicingid' => 'SJS-7175',
          'customernickname' => 'SJS7175',
          'customerstatus' => 'current',
```

```
'subscription_total_amount' => '12276672158.60',
'campaign_subscription_total_amount' => '0.00',
'future_subscription_total_amount' => '0.00',
'future_campaign_subscriptions_total_amount' => '0.00',

'next_invoice_date' => '2014-09-27',
'next_invoice_isfirst' => '1',
'next_invoice_subscriptions' => '12276672158.60',
'next_invoice_total_amount' => '12276672158.60',

'setupfees_inctax' => '0.00',
'subscription_error' => '',

'subscriptions' => [
          {
                    'PRODUCT_TAX_MODE' => 'fixed',
                    'CUSTOMER_SETUP_FEE' => undef,
                    'PRODUCT_ROUND' => 'aritmethic',
                    'QUANTITY' => 1,
                    'NOW' => '2015-04-10 01:05:41.644851-04',
                    'PREMIUM' => '0.000',
                    'SUBACCOUNT_DISPLAY' => '',
                    'DISCOUNT' => '0.000',
                    'TIME_EXCLUDED' => '{}',
                    'PERIOD' => undef,
                    'EFFECTIVE_PRICE' => '34567650.00000',
                    'PRODUCT_FORMULA' => '%%IMPORTVALUE%%',
                    'FREQUENCY' => '1',
                    'EFFECTIVE_DESCRIPTION' => 'Broadband Gold',
                    'CUSTOMER_STATUS' => 'current',
                    'TAX_MODE' => '',
                    'TOTAL' => '38335523.85',
                    'SUBACCOUNT_CUSTOMERID' => '',
                    'PRODUCT_TAFFIC_ALLOWANCE_EXEMPTED' => '',
                    'FORMULA_CHANGED' => 0,
                    'CUSTOMER_STATUS_LABEL' => 'current',
                    'CUSTOMER_VAT_EXEMPT' => '{No}',
                    'EFFECTIVE_TAX_MODE' => 'fixed',
                    'DEFAULT_REFERRAL_SYSTEM' => '0',
                    'EFFECTIVE_SUBACCOUNT_CUSTOMERID' => '',
                    'CUSTOMERID' => '27882',
                    'EFFECTIVE_TAX_ZONE_DISPLAY' => undef,
                    'OVERAGE_ID' => undef,
                    'NOT_USED_UP' => '1',
                    'PREMIUM_EXISTS' => 0,
                    'SUBACCOUNT_STATUS' => '',
                    'PRODUCTID' => '54',
                    'EFFECTIVE_TAX_MODE_DISPLAY' => 'Fixed',
                    'NOMINAL_NEGATIVE' => '',
                    'ROUND' => 'aritmethic',
                    'CURRENT_FROM' => '1',
                    'TAX_ZONE' => '',
                    'PRODUCT_NON_PRORATING' => '0',
                    'TAX_MODE_DISPLAY' => 'Default',
                    'INVOICE_FROM_MASTER' => undef,
                    'NOMINAL' => '',
                    'ON_NEXT_INVOICE_FROM' => '1',
                    'PRODUCT_TAX_ZONE' => '',
                    'EFFECTIVE_FORMULA' => '',
                    'CYCLES_LEFT' => '',
                    'VALID_TO' => '',
                    'EFFECTIVE_TAX_RATE' => '10.900',
                    'ON_NEXT_INVOICE_TO' => '1',
                    'PRODUCT_TAFFIC_ALLOWANCE' => '5',
                    'PRICE' => '34567650.00000',
                    'DISCOUNT_EXISTS' => 0,
                    'TAX_MODE_MULTI' => 0,
                    'CURRENT_TO' => '1',
                    'CUSTOMER_STATUS_COLOR' => '#339933',
                    'FREE_SERVICE' => 'Yes',
                    'PRICE_CHANGED' => 1,
                    'DESCRIPTION_CHANGED' => 0,
                    'date_VALID_FROM' => '',
                    'OVERAGE_FLAG' => undef,
                    'PRODUCT_CODE' => 'BBGOLD',
                    'PRODUCT_PRICE' => '50.00000',
                    'CUSTOMER_DISPLAY' => 'SJS7175 (SJS-7175)',
                    'PRIORITY' => '5',
                    'DESCRIPTION' => '',
                    'VALID_FROM' => '',
                    'ID' => '551',
                    'DYNAMIC_TIED' => undef,
                    'EFFECTIVE_TAX_ZONE' => '',
                    'CUSTOMER_POST_CODE' => '',
                    'TAX_EXEMPTION' => 'No',
                    'PRODUCT_DESCRIPTION' => 'Broadband Gold',
                    'PRODUCT_TAX_RATE' => '10.900',
                    'FREQUENCY_MULTIPLER' => '',
                    'EFFECTIVE_TAX_MODE_MULTI' => 0,
                    'CUSTOMER_TYPE' => 'customer home',
                    'PRORATED' => undef,
                    'PRODUCT_TYPE' => '',
                    'IMPORT_POSITION_ID' => '',
                    'date_VALID_TO' => '',
                    'FORMULA' => undef,
                    'TAX_EXEMPTION_CODE' => '',
                    'EFFECTIVE_TAX_RATES' => [],
                    'VAT_EXEMPTION_FLAG' => 0,
                    'HTML' => '',
                    'TAX_RATES' => [],
                    'CUSTOMER_INSTALLATION_POST_CODE' => '',
                    'TAX_RATE_DEFAULT' => '10.900',
                    'DYNAMIC_DESCRIPTION' => '',
                    'TYPE' => '',
```

```
        'CYCLES' => undef,
        'OVERAGE' => undef,
        'USAGE' => undef,
        'TAX_ZONE_DISPLAY' => undef,
        'TAX_RATE' => '10.900'
},
{
        'PRODUCT_TAX_MODE' => 'fixed',
        'CUSTOMER_SETUP_FEE' => undef,
        'PRODUCT_ROUND' => 'aritmethic',
        'QUANTITY' => 1,
        'NOW' => '2015-04-10 01:05:41.644851-04',
        'PREMIUM' => '0.000',
        'SUBACCOUNT_DISPLAY' => '',
        'DISCOUNT' => '0.000',
        'TIME_EXCLUDED' => '{}',
        'PERIOD' => undef,
        'EFFECTIVE_PRICE' => '50.00000',
        'PRODUCT_FORMULA' => '%%IMPORTVALUE%%',
        'FREQUENCY' => '1',
        'EFFECTIVE_DESCRIPTION' => 'Broadband Gold',
        'CUSTOMER_STATUS' => 'current',
        'TAX_MODE' => '',
        'TOTAL' => '55.45',
        'SUBACCOUNT_CUSTOMERID' => '',
        'PRODUCT_TAFFIC_ALLOWANCE_EXEMPTED' => '',
        'FORMULA_CHANGED' => 0,
        'CUSTOMER_STATUS_LABEL' => 'current',
        'CUSTOMER_VAT_EXEMPT' => '{No}',
        'EFFECTIVE_TAX_MODE' => 'fixed',
        'DEFAULT_REFERRAL_SYSTEM' => '0',
        'EFFECTIVE_SUBACCOUNT_CUSTOMERID' => '',
        'CUSTOMERID' => '27882',
        'EFFECTIVE_TAX_ZONE_DISPLAY' => undef,
        'OVERAGE_ID' => undef,
        'NOT_USED_UP' => '1',
        'PREMIUM_EXISTS' => 0,
        'SUBACCOUNT_STATUS' => '',
        'PRODUCTID' => '54',
        'EFFECTIVE_TAX_MODE_DISPLAY' => 'Fixed',
        'NOMINAL_NEGATIVE' => '',
        'ROUND' => 'aritmethic',
        'CURRENT_FROM' => '1',
        'TAX_ZONE' => '',
        'PRODUCT_NON_PRORATING' => '0',
        'TAX_MODE_DISPLAY' => 'Default',
        'INVOICE_FROM_MASTER' => undef,
        'NOMINAL' => '',
        'ON_NEXT_INVOICE_FROM' => '1',
        'PRODUCT_TAX_ZONE' => '',
        'EFFECTIVE_FORMULA' => '',
        'CYCLES_LEFT' => '',
        'VALID_TO' => '',
        'EFFECTIVE_TAX_RATE' => '10.900',
        'ON_NEXT_INVOICE_TO' => '1',
        'PRODUCT_TAFFIC_ALLOWANCE' => '5',
        'PRICE' => undef,
        'DISCOUNT_EXISTS' => 0,
        'TAX_MODE_MULTI' => 0,
        'CURRENT_TO' => '1',
        'CUSTOMER_STATUS_COLOR' => '#339933',
        'FREE_SERVICE' => 'Yes',
        'PRICE_CHANGED' => 0,
        'DESCRIPTION_CHANGED' => 0,
        'date_VALID_FROM' => '',
        'OVERAGE_FLAG' => undef,
        'PRODUCT_CODE' => 'BBGOLD',
        'PRODUCT_PRICE' => '50.00000',
        'CUSTOMER_DISPLAY' => 'SJS7175 (SJS-7175)',
        'PRIORITY' => '5',
        'DESCRIPTION' => '',
        'VALID_FROM' => '',
        'ID' => '553',
        'DYNAMIC_TIED' => undef,
        'EFFECTIVE_TAX_ZONE' => '',
        'CUSTOMER_POST_CODE' => '',
        'TAX_EXEMPTION' => 'No',
        'PRODUCT_DESCRIPTION' => 'Broadband Gold',
        'PRODUCT_TAX_RATE' => '10.900',
        'FREQUENCY_MULTIPLER' => '',
        'EFFECTIVE_TAX_MODE_MULTI' => 0,
        'CUSTOMER_TYPE' => 'customer home',
        'PRORATED' => undef,
        'PRODUCT_TYPE' => '',
        'IMPORT_POSITION_ID' => '',
        'date_VALID_TO' => '',
        'FORMULA' => undef,
        'TAX_EXEMPTION_CODE' => '',
        'EFFECTIVE_TAX_RATES' => [],
        'VAT_EXEMPTION_FLAG' => 0,
        'HTML' => '',
        'TAX_RATES' => [],
        'CUSTOMER_INSTALLATION_POST_CODE' => '',
        'TAX_RATE_DEFAULT' => '10.900',
        'DYNAMIC_DESCRIPTION' => '',
        'TYPE' => '',
        'CYCLES' => undef,
        'OVERAGE' => undef,
        'USAGE' => undef,
        'TAX_ZONE_DISPLAY' => undef,
        'TAX_RATE' => '10.900'
},
{
        'PRODUCT_TAX_MODE' => 'fixed',
        'CUSTOMER_SETUP_FEE' => undef,
```

```
            'PRODUCT_ROUND' => 'aritmethic',
            'QUANTITY' => '1',
            'PREMIUM' => '0.000',
            'NOW' => '2015-04-10 01:05:41.644851-04',
            'DISCOUNT' => '0.000',
            'SUBACCOUNT_DISPLAY' => '',
            'TIME_EXCLUDED' => '{}',
            'PERIOD' => undef,
            'FREQUENCY' => '1',
            'PRODUCT_FORMULA' => '%%IMPORTVALUE%%',
            'EFFECTIVE_PRICE' => '10000000819.67210',
            'EFFECTIVE_DESCRIPTION' => 'Extensive product',
            'CUSTOMER_STATUS' => 'current',
            'TAX_MODE' => '',
            'TOTAL' => '12200001000.00',
            'SUBACCOUNT_CUSTOMERID' => '',
            'PRODUCT_TAFFIC_ALLOWANCE_EXEMPTED' => '',
            'FORMULA_CHANGED' => 0,
            'CUSTOMER_STATUS_LABEL' => 'current',
            'CUSTOMER_VAT_EXEMPT' => '{No}',
            'EFFECTIVE_TAX_MODE' => 'fixed',
            'DEFAULT_REFERRAL_SYSTEM' => '0',
            'EFFECTIVE_SUBACCOUNT_CUSTOMERID' => '',
            'CUSTOMERID' => '27882',
            'NOT_USED_UP' => '1',
            'OVERAGE_ID' => undef,
            'EFFECTIVE_TAX_ZONE_DISPLAY' => undef,
            'PREMIUM_EXISTS' => 0,
            'SUBACCOUNT_STATUS' => '',
            'PRODUCTID' => '60',
            'EFFECTIVE_TAX_MODE_DISPLAY' => 'Fixed',
            'NOMINAL_NEGATIVE' => '0004734',
            'CURRENT_FROM' => '1',
            'ROUND' => 'aritmethic',
            'TAX_ZONE' => '',
            'PRODUCT_NON_PRORATING' => '0',
            'TAX_MODE_DISPLAY' => 'Default',
            'INVOICE_FROM_MASTER' => undef,
            'NOMINAL' => '1234',
            'ON_NEXT_INVOICE_FROM' => '1',
            'PRODUCT_TAX_ZONE' => '',
            'CYCLES_LEFT' => '',
            'EFFECTIVE_FORMULA' => '',
            'EFFECTIVE_TAX_RATE' => '22.000',
            'VALID_TO' => '',
            'PRODUCT_TAFFIC_ALLOWANCE' => '',
            'ON_NEXT_INVOICE_TO' => '1',
            'PRICE' => undef,
            'TAX_MODE_MULTI' => 0,
            'DISCOUNT_EXISTS' => 0,
            'CURRENT_TO' => '1',
            'DESCRIPTION_CHANGED' => 0,
            'PRICE_CHANGED' => 0,
            'FREE_SERVICE' => 'Yes',
            'CUSTOMER_STATUS_COLOR' => '#339933',
            'PRODUCT_CODE' => '88MT_P2',
            'OVERAGE_FLAG' => undef,
            'date_VALID_FROM' => '',
            'PRODUCT_PRICE' => '10000000819.67210',
            'CUSTOMER_DISPLAY' => 'SJS7175 (SJS-7175)',
            'PRIORITY' => '5',
            'DESCRIPTION' => '',
            'VALID_FROM' => '',
            'ID' => '555',
            'DYNAMIC_TIED' => undef,
            'EFFECTIVE_TAX_ZONE' => '',
            'CUSTOMER_POST_CODE' => '',
            'TAX_EXEMPTION' => 'No',
            'PRODUCT_DESCRIPTION' => 'Extensive product',
            'PRODUCT_TAX_RATE' => '22.000',
            'FREQUENCY_MULTIPLER' => '',
            'EFFECTIVE_TAX_MODE_MULTI' => 0,
            'CUSTOMER_TYPE' => 'customer home',
            'PRORATED' => undef,
            'PRODUCT_TYPE' => '',
            'IMPORT_POSITION_ID' => '',
            'date_VALID_TO' => '',
            'FORMULA' => undef,
            'TAX_EXEMPTION_CODE' => '',
            'EFFECTIVE_TAX_RATES' => [],
            'VAT_EXEMPTION_FLAG' => 0,
            'HTML' => '',
            'TAX_RATES' => [],
            'CUSTOMER_INSTALLATION_POST_CODE' => '',
            'TAX_RATE_DEFAULT' => '22.000',
            'DYNAMIC_DESCRIPTION' => '',
            'TYPE' => '',
            'CYCLES' => undef,
            'OVERAGE' => undef,
            'USAGE' => undef,
            'TAX_ZONE_DISPLAY' => undef,
            'TAX_RATE' => '22.000'
    },
    {
            'CUSTOMER_SETUP_FEE' => undef,
            'PRODUCT_TAX_MODE' => '',
            'QUANTITY' => 1,
            'PRODUCT_ROUND' => 'aritmethic',
            'NOW' => '2015-04-10 01:05:41.644851-04',
            'PREMIUM' => '0.000',
            'SUBACCOUNT_DISPLAY' => '',
            'DISCOUNT' => '0.000',
            'TIME_EXCLUDED' => '{}',
            'PERIOD' => undef,
            'EFFECTIVE_PRICE' => '10.00000',
```

```
                'PRODUCT_FORMULA' => '%%CUSTOMER_PRODUCT_SUM%%',
                'FREQUENCY' => '1',
                'EFFECTIVE_DESCRIPTION' => 'Dynamic Product',
                'CUSTOMER_STATUS' => 'current',
                'TAX_MODE' => '',
                'TOTAL' => '38335579.30',
                'PRODUCT_TAFFIC_ALLOWANCE_EXEMPTED' => '',
                'SUBACCOUNT_CUSTOMERID' => '',
                'FORMULA_CHANGED' => 0,
                'CUSTOMER_VAT_EXEMPT' => '{No}',
                'CUSTOMER_STATUS_LABEL' => 'current',
                'EFFECTIVE_TAX_MODE' => '',
                'DEFAULT_REFERRAL_SYSTEM' => '0',
                'EFFECTIVE_SUBACCOUNT_CUSTOMERID' => '',
                'CUSTOMERID' => '27882',
                'EFFECTIVE_TAX_ZONE_DISPLAY' => undef,
                'OVERAGE_ID' => undef,
                'NOT_USED_UP' => '1',
                'PREMIUM_EXISTS' => 0,
                'SUBACCOUNT_STATUS' => '',
                'PRODUCTID' => '68',
                'EFFECTIVE_TAX_MODE_DISPLAY' => 'Default',
                'NOMINAL_NEGATIVE' => '',
                'ROUND' => 'aritmethic',
                'CURRENT_FROM' => '1',
                'TAX_ZONE' => '',
                'PRODUCT_NON_PRORATING' => '0',
                'TAX_MODE_DISPLAY' => 'Default',
                'ON_NEXT_INVOICE_FROM' => '1',
                'NOMINAL' => '',
                'INVOICE_FROM_MASTER' => undef,
                'PRODUCT_TAX_ZONE' => '',
                'EFFECTIVE_FORMULA' => '',
                'CYCLES_LEFT' => '',
                'VALID_TO' => '',
                'EFFECTIVE_TAX_RATE' => '14.000',
                'ON_NEXT_INVOICE_TO' => '1',
                'PRODUCT_TAFFIC_ALLOWANCE' => '',
                'PRICE' => undef,
                'DISCOUNT_EXISTS' => 0,
                'TAX_MODE_MULTI' => 0,
                'CURRENT_TO' => '1',
                'CUSTOMER_STATUS_COLOR' => '#339933',
                'FREE_SERVICE' => 'Yes',
                'PRICE_CHANGED' => 0,
                'DESCRIPTION_CHANGED' => 0,
                'date_VALID_FROM' => '',
                'OVERAGE_FLAG' => undef,
                'PRODUCT_CODE' => 'dynamicp1',
                'PRODUCT_PRICE' => '10.00000',
                'CUSTOMER_DISPLAY' => 'SJS7175 (SJS-7175)',
                'PRIORITY' => '5',
                'DESCRIPTION' => '',
                'VALID_FROM' => '',
                'ID' => '554',
                'EFFECTIVE_TAX_ZONE' => '',
                'DYNAMIC_TIED' => '54,55',
                'CUSTOMER_POST_CODE' => '',
                'PRODUCT_TAX_RATE' => '',
                'PRODUCT_DESCRIPTION' => 'Dynamic Product',
                'TAX_EXEMPTION' => 'No',
                'FREQUENCY_MULTIPLER' => '',
                'EFFECTIVE_TAX_MODE_MULTI' => 0,
                'PRODUCT_TYPE' => 'Dynamic',
                'PRORATED' => undef,
                'CUSTOMER_TYPE' => 'customer home',
                'FORMULA' => undef,
                'date_VALID_TO' => '',
                'IMPORT_POSITION_ID' => '',
                'TAX_EXEMPTION_CODE' => '',
                'EFFECTIVE_TAX_RATES' => [],
                'HTML' => '',
                'VAT_EXEMPTION_FLAG' => 0,
                'TAX_RATES' => [],
                'TAX_RATE_DEFAULT' => '14.000',
                'CUSTOMER_INSTALLATION_POST_CODE' => '',
                'DYNAMIC_DESCRIPTION' => '',
                'CYCLES' => undef,
                'TYPE' => '',
                'OVERAGE' => undef,
                'USAGE' => undef,
                'TAX_ZONE_DISPLAY' => undef,
                'TAX_RATE' => '14.000'
            }
        ],
};
```


5.3.9 Customer SAND Notification

Customer SAND Notification covers the following information:

1. trigger details (LogType, NAME, LABEL, Triggers, Filename, ID, OPERATOR), these attributes can be ignored in general.
2. Customer Account base details (customerid, customername, customerstatus, customernickname), this set of attributes provide base details for account for which trigger has been sent.
3. SAND status:
    a. status - final SAND status an account is on it can be one of following: clear, billing_issue, email_1, email_2, email_3, overage, throttling, disconnection. These statuses correspond to SAND settings.

b. type - it can either be:
a) invoice - when invoice due threshold has been hit
b) lodgement - when lodgement processing error threshold has been hit
c) traffic - when cusotmer went over his monthly/weekly CAP
d) condition - gives details on condition/threshold that has been breached
e) details - provide further details related to the threshold breached

4. specific SAND sections status - (traffic, invoice and lodgment trees will cover each particular status)

```
{
        'ID' => '1',
        'OPERATOR' => 'testss',

        'LogType' => 'customer_sand_notification',
        'NAME' => 'generic_filelog',
        'LABEL' => 'Generic Filelog',
        'Triggers' => '',
        'Filename' => 'logfile.log',

        'customerid' => '27737',
        'customername' => 'Maciej Gawlowski',
        'customerstatus' => 'installed',
        'customernickname' => 'tel8252',

        'status' => 'disconnection',
        'type' => 'lodgement',
        'condition' => '10 days',

        'details' => {
                '171' => {
                        'faildate' => '2015-04-10',
                        'amount' => '1488.30',
                        'customerid' => '27737',
                        'paymentdate' => '2015-04-07',
                        'sageinvoiceid' => '171'
                }
        },

        'traffic' => {
                'status' => 'disconnection',
                'condition' => '101 %',
                'details' => {
                        'weekdown' => 0,
                        'captotal' => 0,
                        'w1up' => 0,
                        'm1down' => 0,
                        'd2down' => 0,
                        'm1up' => 0,
                        'd1down' => 0,
                        'w1down' => 0,
                        'capup' => 0,
                        'capdown' => 0,
                        'blackout' => 0,
                        'd1up' => 0,
                        'd2up' => 0,
                        'weekup' => 0
                },
        },

        'lodgement' => {
                'status' => 'disconnection',
                'condition' => '10 days',
                'details' => {
                        '171' => {
                                'faildate' => '2015-04-10',
                                'amount' => '1488.30',
                                'customerid' => '27737',
                                'paymentdate' => '2015-04-07',
                                'sageinvoiceid' => '171'
                        }
                },
        },

        'invoice' => {
                'status' => 'disconnection',
                'condition' => '10 days',
                'details' => {
                        '95' => {
                                'invoiceno' => '95',
                                'amountcredited' => 0,
                                'amount' => '410.00',
                                'balance' => 410,
                                'customerid' => '27737',
                                'age' => '1 year 11 mons 5 days',
                                'amountpaid' => 0
                        },
                        '111' => {
                                'invoiceno' => '111',
                                'amountcredited' => 0,
                                'amount' => '810.00',
                                'balance' => 810,
                                'customerid' => '27737',
                                'age' => '1 year 4 mons 5 days',
                                'amountpaid' => 0
                        },
                },
        },
};
```

6 Generic Filelog

6.1 Introduction

This module has primarily been created for debugging. It allows operators to dump each triggered message to be saved to a file that than can be reviewed from the "View Log" button on the Triggers setup page. (Settings – External API (Triggers)).

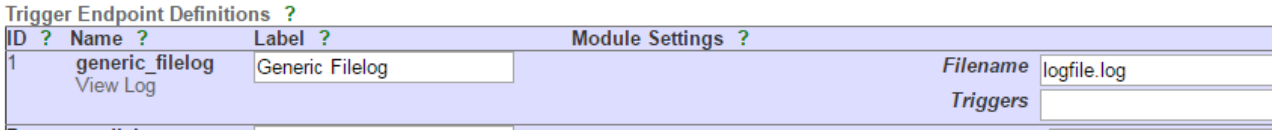


Fig. 6.1-1: Generic Filelog setup

6.2 Generic Filelog setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

- ***Filename*** – specify the file name the log should be stored to.

Optional Settings:

- ***Triggers***: If defined, this field helps narrow down the file logging to specified triggers only, otherwise transaction details will be logged for all. If multiple triggers are to be logged, please add them as a comma separated list. Below find all trigger names that can be used in the field:
  - *customer_details_change*
  - *customer_status_change*
  - *eft_change*
  - *creditcard_change*
  - *subscription_change*
  - *invoice_change*
  - *product_change*
  - *customer_subscriptions*
  - *customer_sand_notification*
  - *radius_username_change*
  - *radius_send_coa_pod*
  - *customer_equipment_synchronize*

7 Extenet LTE EPC Integration

7.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and Extenet Networks for LTE deployments.

Any LTE networks managed with the Extenet EPC can be integrated with the Azotel SIMPLer platform. SIMPLer uses the Extenet API to synchronize customer accounts.

Customers are using LTE devices with SimCards inserted. In reality, it is the SIM Card details that actually are used to authenticate the customer on to the network – CPE's can be swapped upon failure – as long as the SimCard remains the same – it will be authenticated seamlessly after the swap. Upon authentication the CPE sends the SimCard details to LTE Access Point which forwards the SimCard identity to the Extenet EPC. If a particular user (SIM Card) is set on the Extenet EPC server – the CPE it is on will get authenticated to the network and any usage generated by it – will be accounted towards the customer account in SIMPLer.

7.2 Extenet EPC trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

Before setting up Extenet EPC, the below API access details must be obtained:

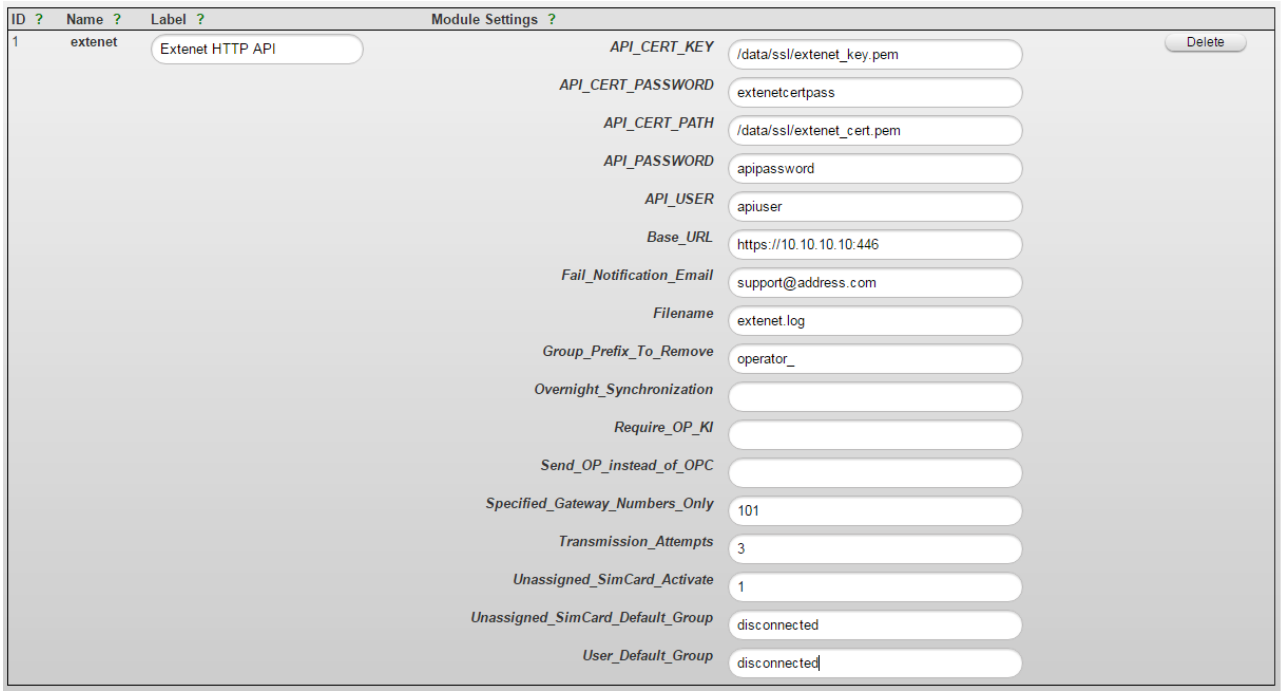
- ***API Base URL*** - this is the API URL that will be used by SIMPLer to communicate with i.e. https://172.20.100.4:446
- ***API User*** – Username SIMPLer platform should send to authenticate with API
- ***API Password*** – Password related to the Username
- ***P12 Certificate –*** *this certificate obtained from Extenet is to be sent to Azotel – where it will be converted and installed and ultimately certificate path, key and key password will be provided back*

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module:

- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent to any location.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Group_Prefix_To_Remove*** – if defined, this option helps to remove any prefix from group attributes passed through the API. This typically would be set to 'operator_' to help remove automatically added 'operator_' prefix to each RADIUS group in SIMPLer.
- ***Overnight_Synchronization*** **–** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Extenet RADIUS server. This is option is not recommended to use unless there are multiple communication issues between SIMPLer and Extenet EPC server.
- ***Unassigned_SimCard_Activate*** **–** if set to "1" it enables synchronization of SimCards that are not assigned to any customer account in SIMPLer. Accounts added to Extenet EPC will be active with pre-set profiles. This can help to pre-activate SimCards with a "Walled Gardened" profile. That than can be used for easier installation. Once a SimCard is assigned to a customer in SIMPLer this account in Extenet EPC will be "taken over" and provisioned with customer details, rather than the default profile.
- ***Unassigned_SimCard_Default_Group*** **–** profile group that is to be used for Extenet EPC accounts that are created for SimCards unassigned to any customer account in SIMPLer. This should be a dedicated group that will restrict resources for these SimCard accounts (i.e. apply Walled Garden, allocate IP from a private IP subnet, limit connection speeds).

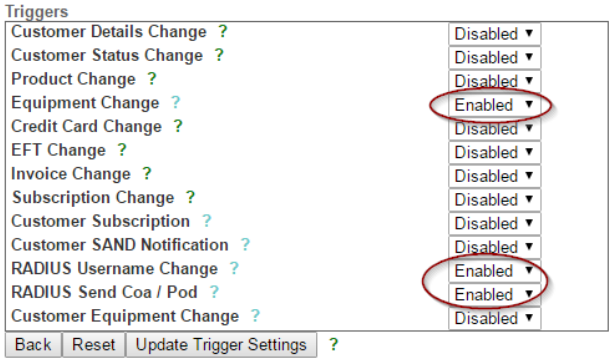
- ***User_Default_Group -*** profile group that is to be used for Extenet EPC accounts that for whatever reason have no RADIUS group assigned to a customer account in SIMPLer.



7.2.1 Example Extenet API configuration entry

The Extenet EPC requires triggers shown on the screenshot at Fig. 7.2.2 to be enabled as a part of the configuration process:

- ***RADIUS Username Change*** – enabling this trigger is required to synchronize SimCards assigned to customer accounts.
- ***Equipment Change*** – enabling this trigger is required to synchronize SimCards that are not assigned to any customers.
- ***RADIUS Send Coa / Pod*** – enabling this trigger is required to re-authenticate customer CPEs with new settings upon any account changes.



7.2.2 Example Extenet API configuration entry

7.3 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled, as the synchronization with the Extenet EPC server uses SIMPLer RADIUS to store synchronized accounts as well as to collet usage statistics.
- ***Bucket*** – Preferably mapped to a RADIUS group for automation purposes (i.e. changing QoS profile in Extenet EPC based on bucket the customer is assigned to).

- ***SimCard*** – SimCard should have KI and OPCODE for the integration to work – unless there is already one set.
- ***CPE LTE*** – SimCard should be assigned to this LTE CPE – which will enable the synchronization module.

Once the above conditions are met, the account from SIMPLer should be synchronized to the Extenet EPC server.

Note: In the case of equipment that was pre-imported to the system, once the process of assigning equipment to customers has been completed, any SIM Card account that was previously activated under the server as unassigned, will now take the correct settings from the customer account.

Below please find the steps required to set up a customer account in SIMPLer with a SIM Card and an LTE CPE:

- **Step One**: Change the customer gateway to the 'Radius Enabled Gateway' (See Fig. 7.3-1) and change the bucket to whatever it should be for the particular customer, unless the bucket is subscription driven, in which case please make sure an appropriate subscription has been set under the customer account.

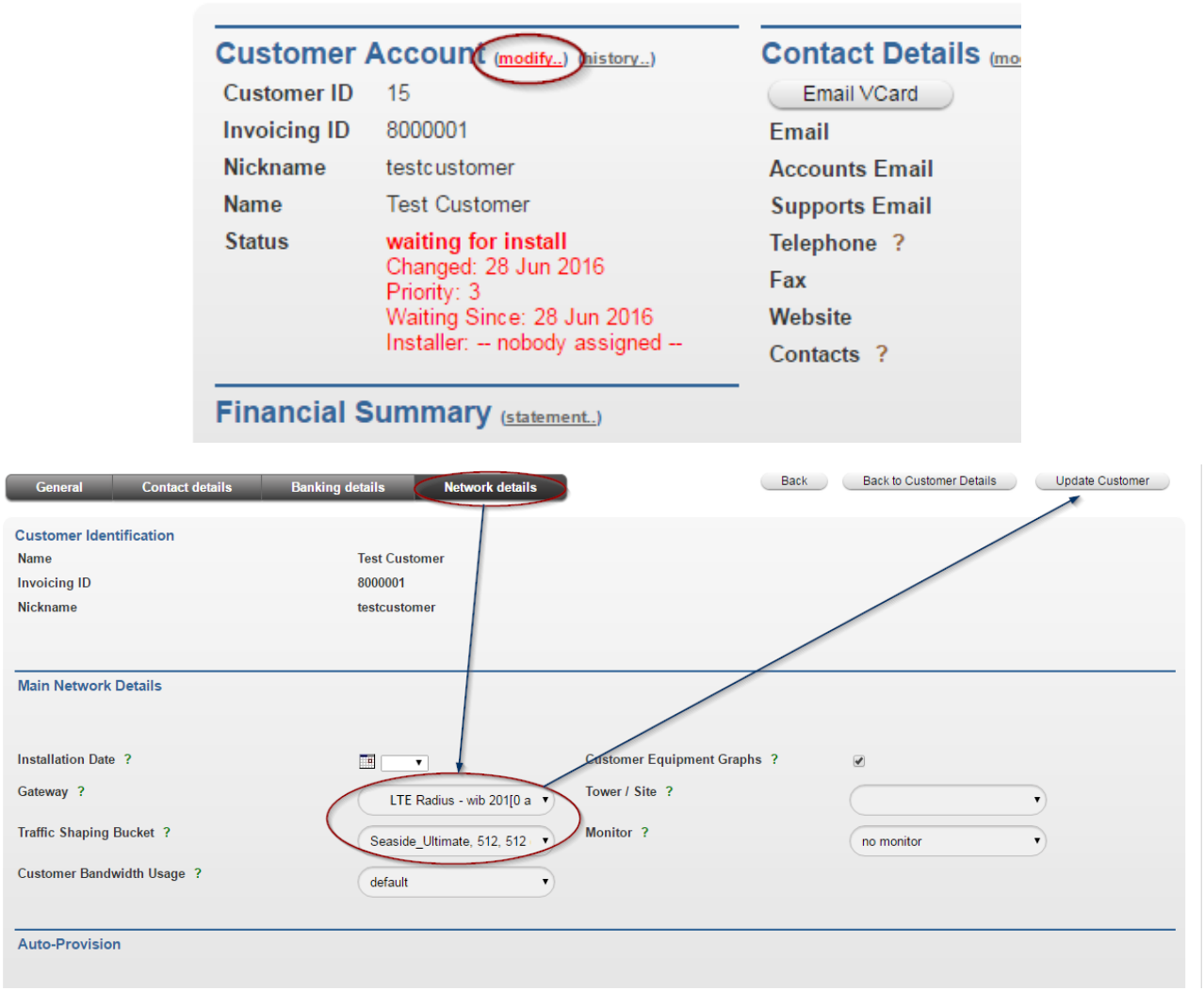


Fig. 7.3-1: Extenet EPC – Radius Bucket

- **Step Two:** Once the customer gateway / bucket changes have been submitted, a RADIUS subsection (highlighted in green on the screenshot at fig. 7.3-2) will appear under the network details on customer details page. Next click on the 'modify' link next to the Equipment Details. This takes the operator to the customer equipment management page. (See Fig. 7.3-2)

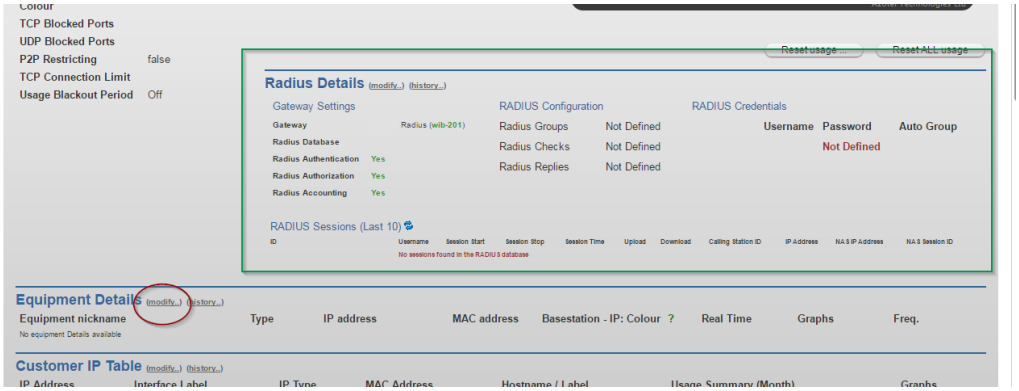


Fig. 7.3-2: Modify Equipment

- ***Step Three:*** Find both LTE CPE and SIM Card that the respective customer is using and click on the 'Add' button next to them to add them to the customer assigned equipment. All equipment in "stock" will be available for selection here. (See Fig. 7.3-3).

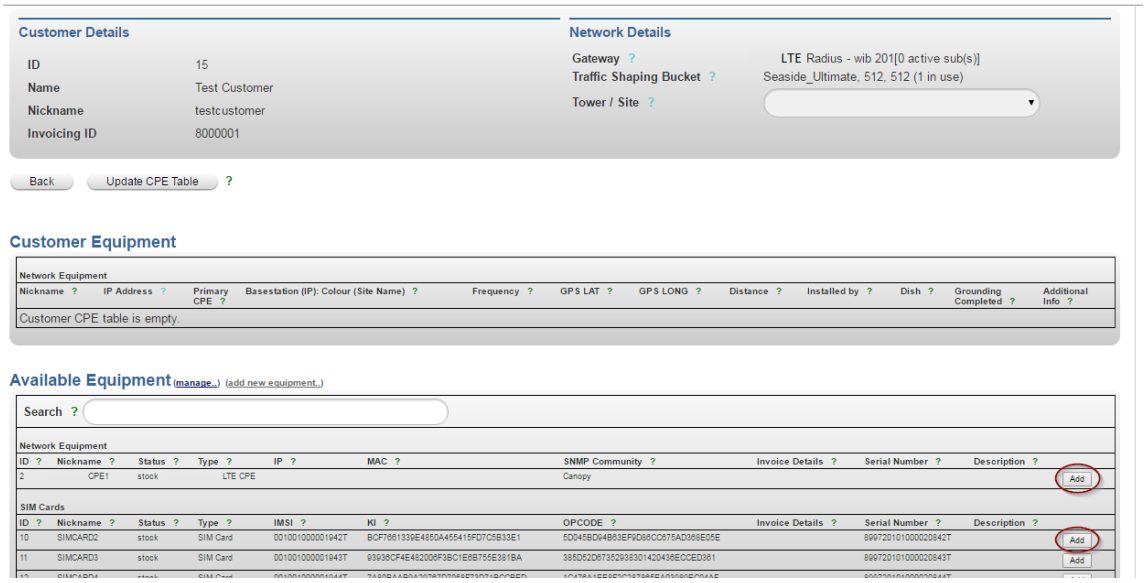


Fig. 7.3-3: Add Equipment

- ***Step Four:*** Once both theLTE CPE and SIM Card have been added to 'Customer Equipment', choose the recently added LTE CPE from the 'Equipment Attached to' dropdown in the SIM Cards section. This will tie the SIM Card to LTE CPE and allow for some additional automatons to be set i.e. the IP address displayed under the customer equipment will be automatically updated based on the IP currently attached to the SIM Card. (See Fig. 7.3-4).

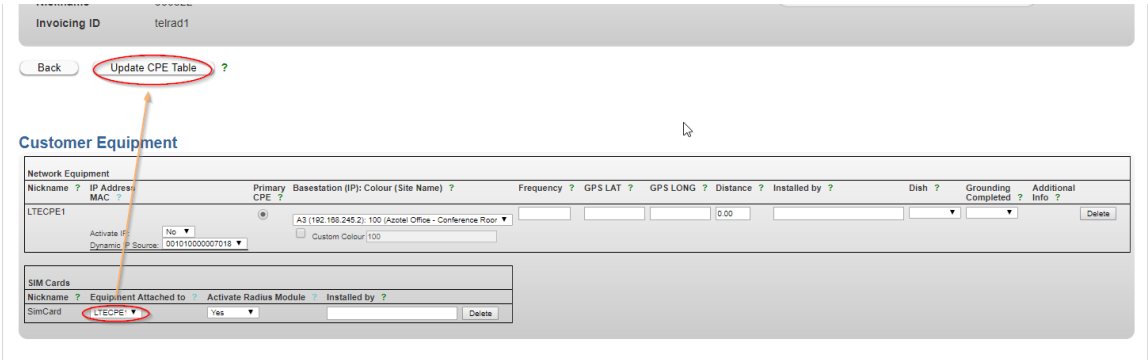


Fig. 7.3-4: Equipment Attachment

- ***Step Five:*** After the above step is completed, a RADIUS Details section will appear under customer details fully set with appropriate credentials (based on SIM Card IMSI attribute) as well as there will be two entries in the 'Equipment Details' table. (See Fig. 7.3-5).

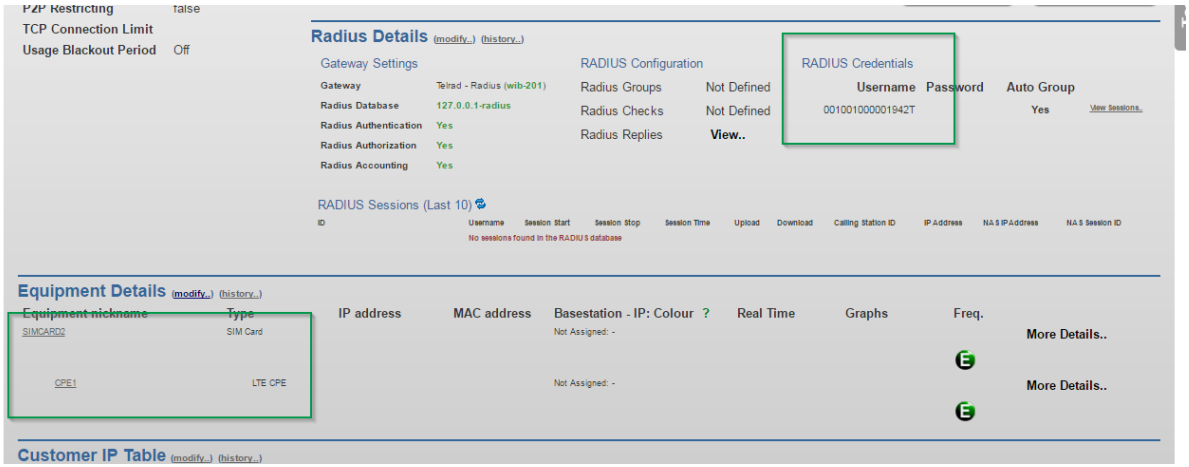


Fig. 7.3-5: RADIUS Credentials

- ***Step Six:*** The last step (optional) in the process of setting up a customer account is to add a static IP address to the customer account. Click on 'modify' button in the 'Customer IP Table' section of the Customer Details page. (See Fig. 7.3-6).

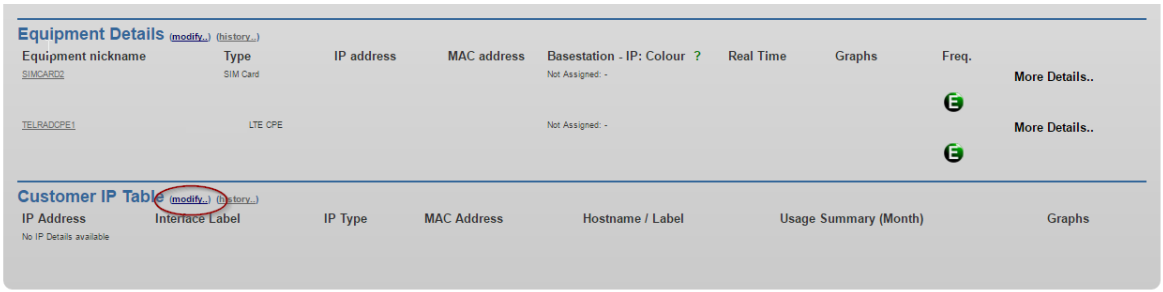


Fig. 7.3-6: Modify IP Address

- **Step Seven**: Generate the IP address from our pre-defined IP Pools, or Define the IP address manually. Select the IMSI on the SIM Card from the 'RADIUS Username' dropdown. This will ensure that the IP address will be allocated to the LTE CPE via a RADIUS session off the Extenet EPC Server. (See Fig. 7.3.-7).

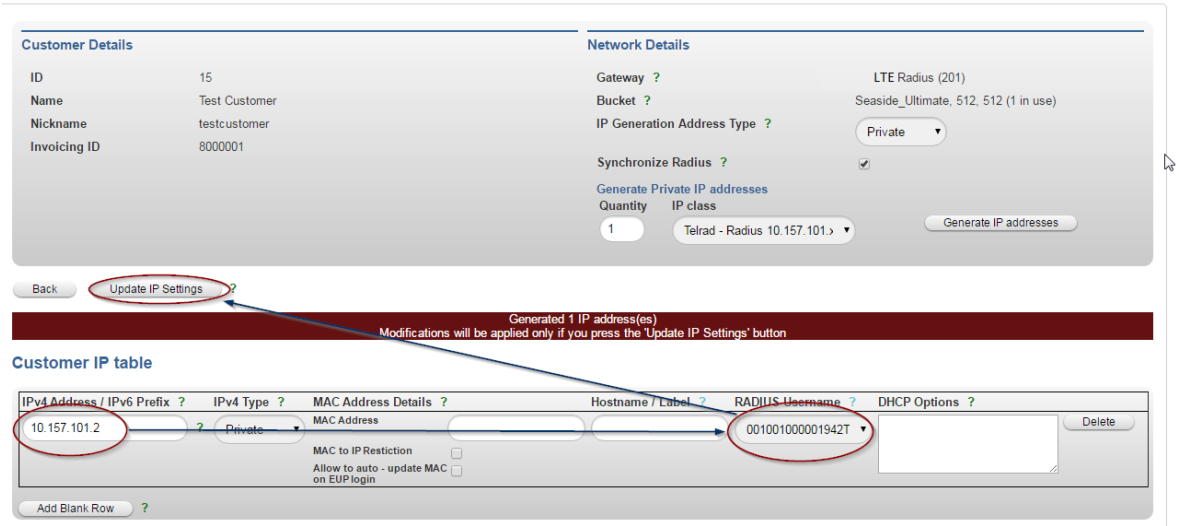
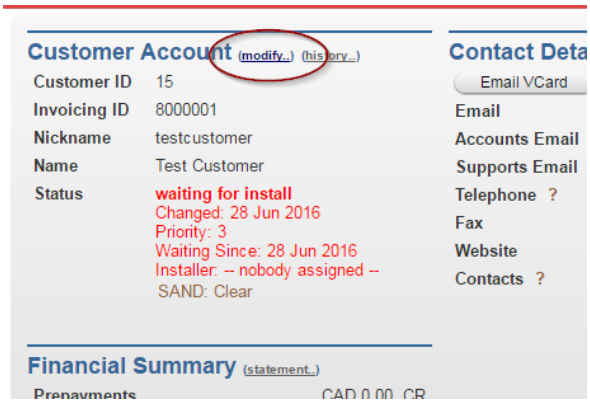


Fig. 7.3-7: Add IP Addresses

- Note that only 'current' customers will get access to the internet (and their CPE provisioned with the proper QoS as per the bucket). So it might make sense to change the customer account status to 'current' while installing. Accounts for customers in any other state than 'current' will be put into an 'activated' state at the Extenet EPC server.



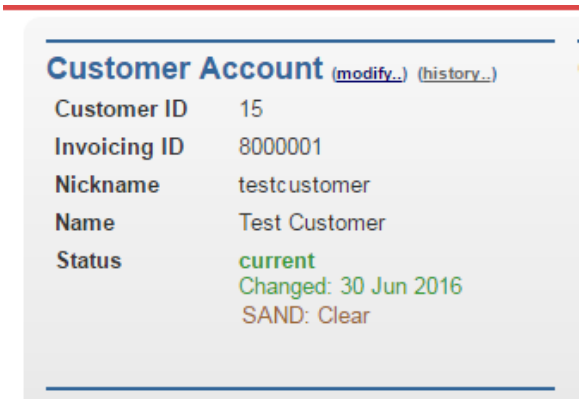


Fig. 7.3-8: Current Status

7.4 Import Sim Cards / LTE CPE equipment from CSV files

SIM Cards and LTE gear, as well as any other piece of equipment, can be imported to the SIMPLer platform from CSV files using the ***'Import Data'*** tool. Use of the import tools has been well described under below entry of Azotel WiKi pages:

http://wiki.azotel.com/simpler-features/features-index-1/import-interface

Note: depending on the settings used in the API configuration, Sim Cards that have been imported can be activated in Extenet EPC server typically with an *"Unprovisioned"* profile which can be very helpful in the installation process, where having pre-activated SIM-Cards can help the installer test the connection on the spot without any additional steps required to activate the connection.

For the benefit of this manual below please find the steps that outline the import process:

- ***Step One****:* Click on the 'Import Data' button from the 'Settings' menu in SIMPLer. (See Fig. 7.4-1).

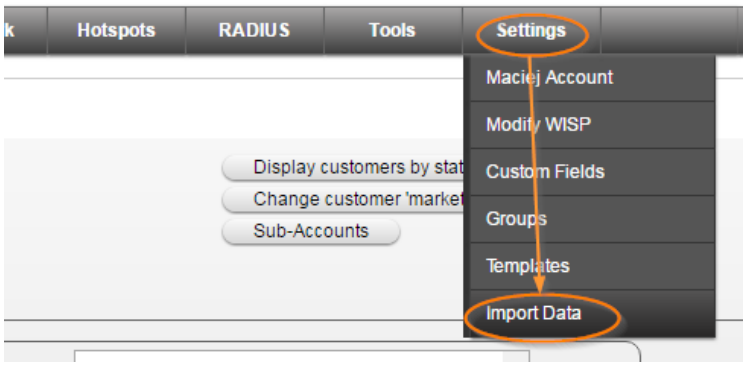


Fig. 7.4-1: Settings – Import Data

- ***Step Two:*** Pick the 'Equipment' option from the 'Table to be populated' dropdown menu. Submit your choice with the 'Load Interface' button. (See Fig. 7.4-2) This will bring up an interface dedicated to uploading Equipment positions to the SIMPLer platform.

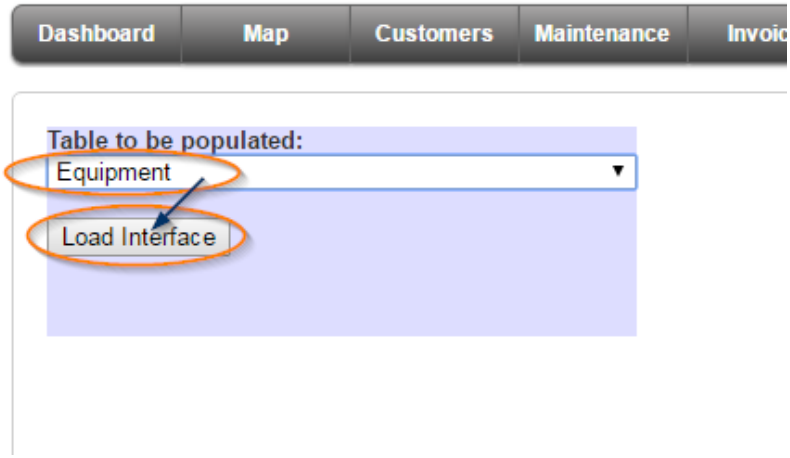


Fig. 7.4-2: Import Data – Equipment

- ***Step Three:*** Prepare the CSV file for upload. For SIM Cards used in the Extenet EPC environment it should at least contain the following six columns:
  - **Nickname** – Unique equipment nickname – SIMPLer will not allow duplicates in this field. This must be in the first column of the imported file.
  - **IMSI** – International Mobile Subscriber Identity.
  - **KI** – Key (K) required for authentication.
  - **OPCODE** – Opc required for authentication.
  - **Type** – it should be set to 'SIM Card'.
  - **Status** – It should be set to "stock" if you will need to re-assign these pieces of equipment to customers at a later date.

Nickname	IMSI	ICCID	PIN1	PUK1	ADM1	PIN2	K	OPc
SIMCARD1	001001000001941	8997201010000020841	1111	11111111	A519C1B6E3BBB4CA	2222	0D190F9F15714A536C121BDD95F5431C	63F62FB7C65A812A357F7A0C31
SIMCARD2	001001000001942	8997201010000020842	1111	11111111	00E0D655A3A9ECD8	2222	BCF7661339E4850A455415FD7C5B33E1	5D045BD94B63EF9D86CC675AD3
SIMCARD3	001001000001943	8997201010000020843	1111	11111111	29E0EA92E1774A9D	2222	93936CF4E482006F3BC1E6B755E381BA	385D52D67352938301420436EC
SIMCARD4	001001000001944	8997201010000020844	1111	11111111	2420E27CC918259C	2222	7A80BAAB9A29767D7058F73D71BCCBED	1C476A1EE8F2C287865EA03989
SIMCARD5	001001000001945	8997201010000020845	1111	11111111	BCE4E88A047A54FC	2222	FB86D23094EECBDBD6CF83F371B1FC9C	C05097C1971A14B487CE88CBBD

Fig. 7.4-3: Example import Spreadsheet for SimCards

An example CSV file format can be found on the below screenshot (Fig. 7.4-4). To summarise, it must be comma separated with " used as a string delimiter.

```
"SIMCARD1","001001000001941","899720101000020841","1111","11111111","A519C1B6E3BBB4CA","2222","0D190F9F15714A536C121BDD95F5431C","63F62FB7C65A812A357F7A0C311620F5","SIM Card"
"SIMCARD2","001001000001942","899720101000020842","1111","11111111","00E0D655A3A9ECD8","2222","BCF7661339E4850A455415FD7C5B33E1","5D045BD94B63EF9D86CC675AD368E05E","SIM Card"
"SIMCARD3","001001000001943","899720101000020843","1111","11111111","29E0EA92E1774A9D","2222","93936CF4E482006F3BC1E6B755E381BA","385D52D6735293830142043 6ECCED361","SIM Card"
"SIMCARD4","001001000001944","899720101000020844","1111","11111111","2420E27CC918259C","2222","7A80BAAB9A29767D7058F73D71BCCBED","1C476A1EE8F2C287865EA03989EC04AF","SIM Card"
"SIMCARD5","001001000001945","899720101000020845","1111","11111111","BCE4E88A047A54FC","2222","FB86D23094EECBDBD6CF83F371B1FC9C","C05097C1971A14B487CE88CBBDB2998D","SIM Card"
```

Fig. 7.4-4: Example CSV

- ***Step Four:*** Once the CSV file is prepared, columns reflecting the file format should be chosen by double clicking the field name in the left-hand column, you will transfer it to the right-hand column, which represents the fields that will be imported, and then select the file to upload and finally click on the 'Upload File' button to start importing process. (See Fig. 7.4-5).

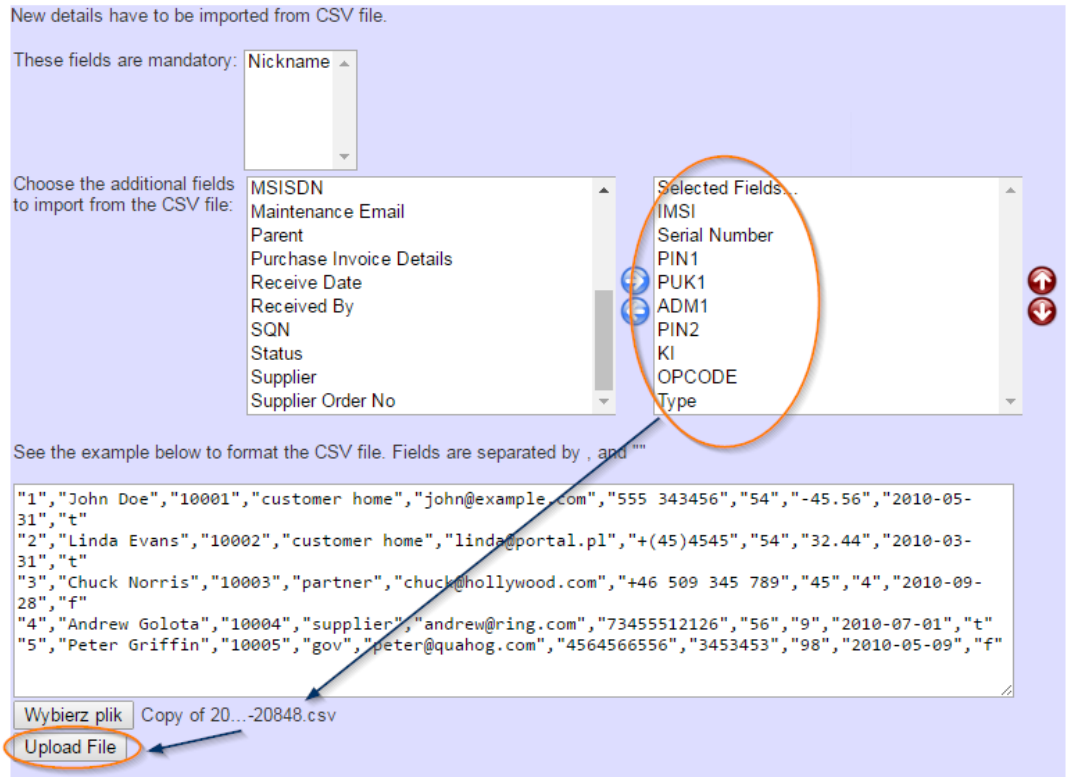


Fig. 7.4-5: Upload File Process

- ***Step Five:*** This will bring a page where data from the uploaded file is interpreted. Any errors will be highlighted and must be corrected before SIMPLer will allow the data set to be imported. Click the 'IMPORT' button once the data set has been reviewed. (See Fig. 7.4-6).

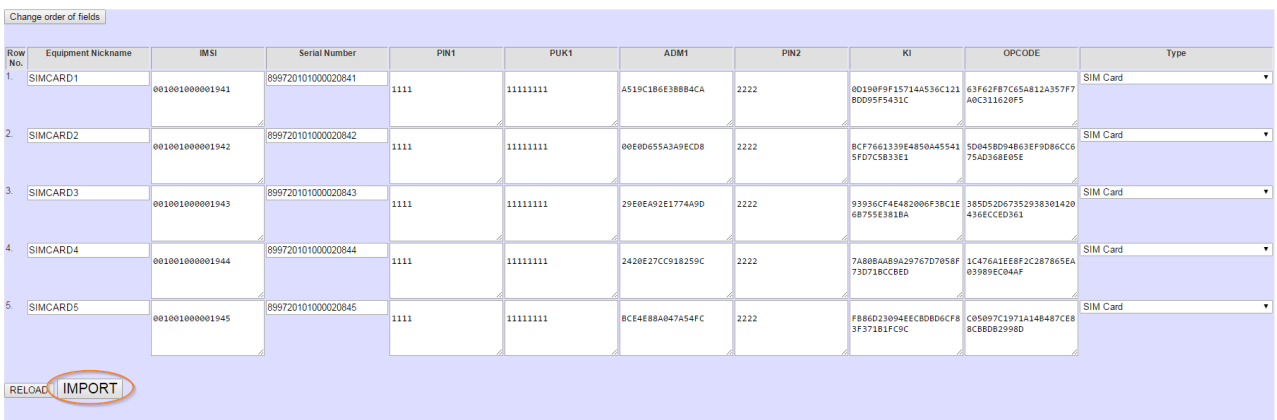


Fig. 7.4-6: File Review and Import

7.5 Add Sim Cards / LTE CPE Manually

SIM Cards, LTE CPE as well as any other equipment can also be added to the SIMPLer platform manually. Following below steps to add a Sim Card to SIMPLer platform – note that pretty much same steps apply to LTE CPE:

- ***Step One***: Click on ***'Equipment Details'*** from the ***'Network'*** submenu to navigate the equipment page that lists all equipment available in the operator instance. There click on the ***'Add'*** button. Alternatively you can directly click on the ***'Add New Equipment'*** option from the ***'Network'*** submenu. (See Fig. 7.5-1).

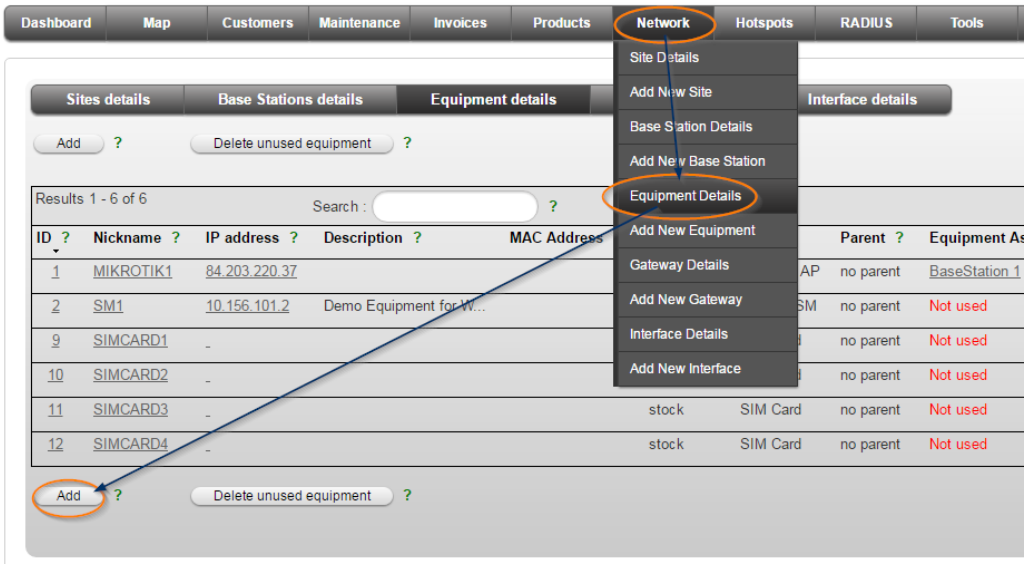


Fig. 7.5-1: File Review and Import

- ***Step Two:*** Fill out the new SIM Card details. Make sure to use ***'SIM Card'*** as the ***'Type'***. This will enable additional, sim card related details section where the IMSI, KI, and OPCODE can be filled out. The type should also be set as ***"stock"*** because this will make it available for selection once you are ready to assign it to a customer. Once done editing simcard attributes click on the ***'Add'*** button. (See Fig. 7.5-2).

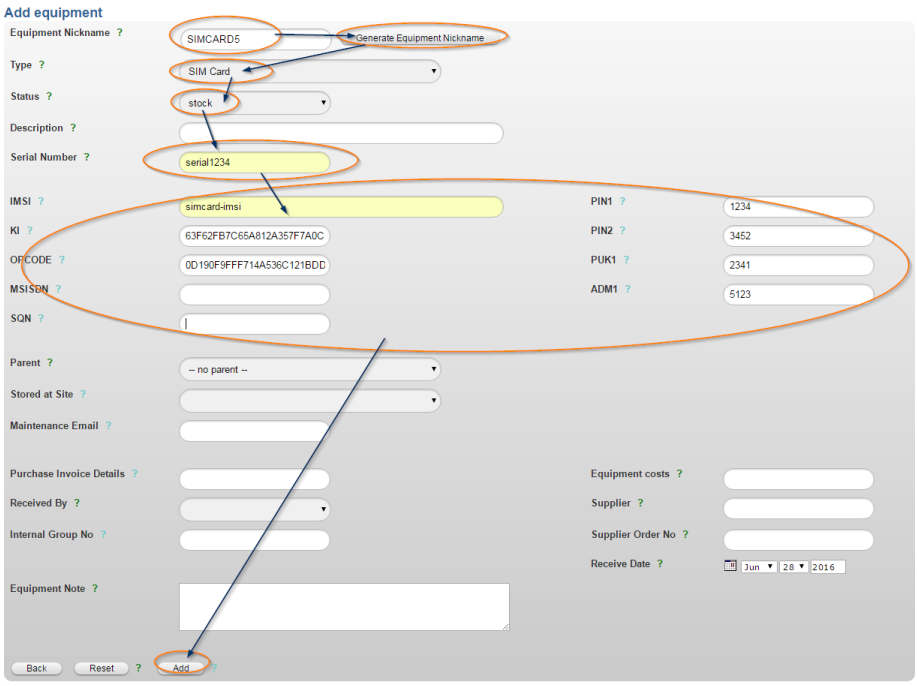


Fig. 7.5-2: Add Sim Card

7.6 Map Extenet EPC Profile to SIMPLer Bucket

SimCard profiles in Extenet EPC require being assigned to a 'Profile' that defines all aspects of customer connection attributes i.e. quality of service details. Each production used profile that has been set under Extenet EPC must be mapped to a respective bucket in the SIMPLer platform under every operator instance that is interfacing with a particular Extenet EPC server. Below are the steps that outline how to do so:

- ***Step One:*** Navigate to ***'RADIUS'*** server tab in SIMPLer platform than click on ***'Group Reply'*** button from the left side menu. (See Fig. 7.6-1).

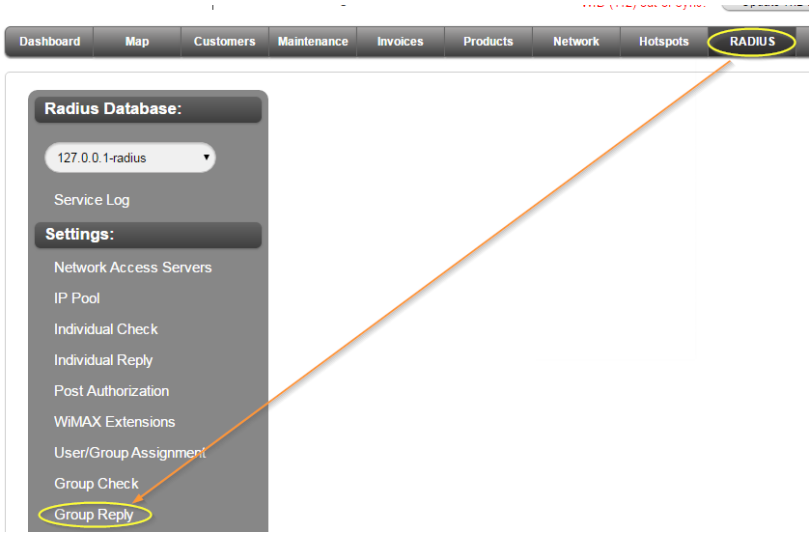


Fig. 7.6-1: RADIUS Group Reply

- ***Step Two***: Review the group names found on the RADIUS Group Reply page and check if your new group is missing from it. Note that each group name from Extenet EPC will automatically be prefixed with operator instance name followed by an underscore (i.e. operator_). If your group is missing – do click on the ***'Add'*** button. (See Fig. 7.6-2).

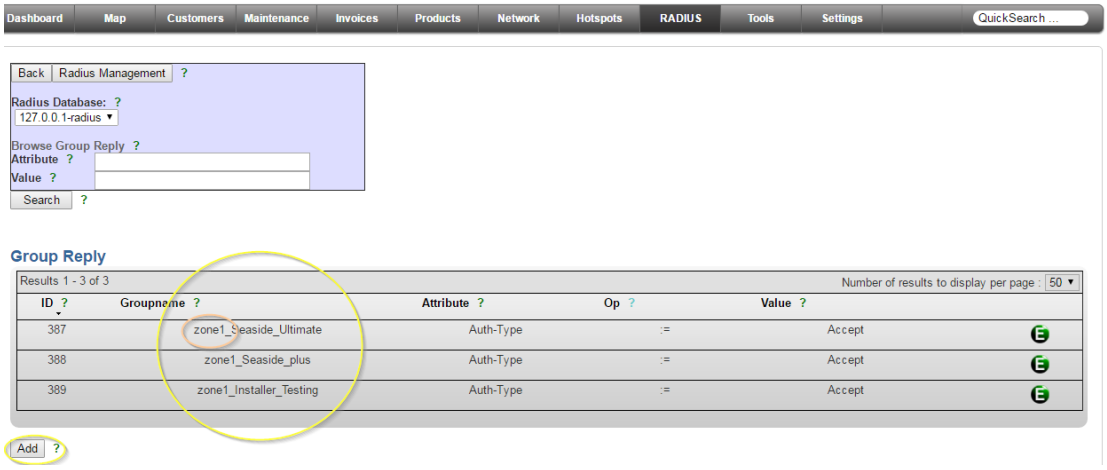


Fig. 7.6-2: Add RADIUS Group

- ***Step Three:*** On the ***'Add Group Radius Reply'*** page click on ***'Define new Group'*** radio button, then fill out the group name field exactly with a group name as per Extenet EPC requirements, make sure that ***'FreeRADIUS-Internal'*** dictionary is set. Pick the ***'Acct-Type'*** from Attribute dropdown, ***':='*** option from ***'Op'*** dropdown and fill out ***'Value'*** field with ***'Accept'***. Verify the form and then click ***'Add'*** to confirm adding a new group. (See Fig. 7.6-3).

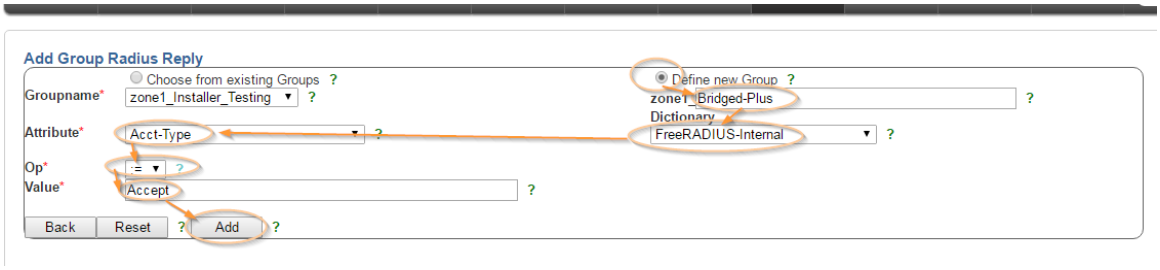


Fig. 7.6-3: Define RADIUS Group Reply

- ***Step Four:*** Verify the new Radius Group has been added (see Fig, 7.6-4).

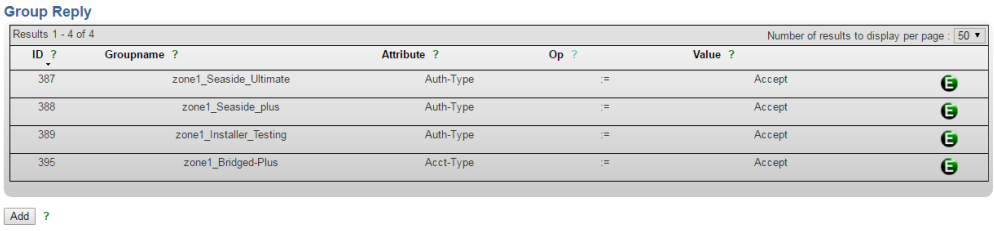


Fig. 7.6-4: Group Verification

- ***Step Five:*** To complete mapping of the RADIUS group to a gateway bucket, please navigate to the ***'Gateway Details'*** page from the ***'Network'*** popup menu. Then click on the blue ***'B'*** button to get to the buckets page of the 'LTE – Radius' gateway. (See Fig. 7.6-5).

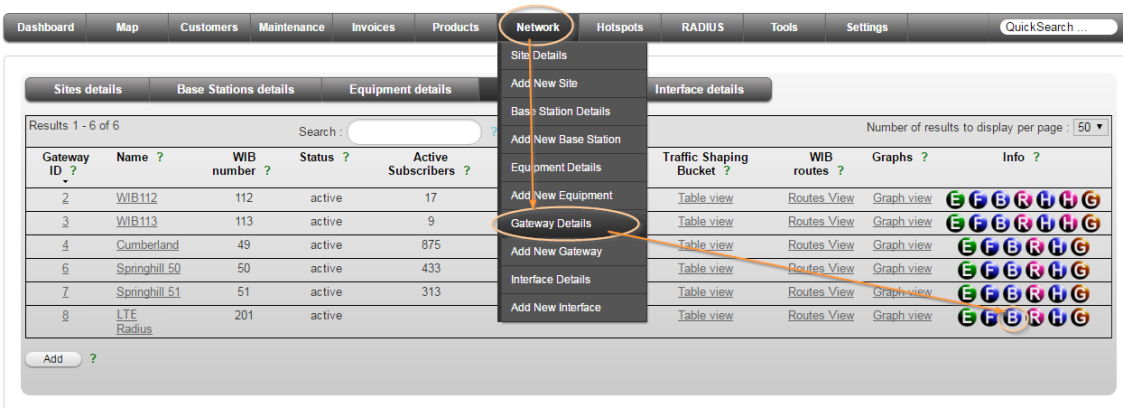


Fig. 7.6-5: Bucket Definition

- ***Step Six:*** Fill out new bucket details. It is a good practice to use the Group name as a bucket name for easy mapping. That being said it is not mandatory. Fill out Downlink / Uplink details. These fields are informational and will not be used by the Extenet EPC integration. That being said it is best to fill them out as accurately as possible, so that CSR's know what speeds customers can expect. Click on the ***'Add'*** button to confirm adding new bucket then click on ***'Update Buckets Table'***. (See Fig. 7.6-6).

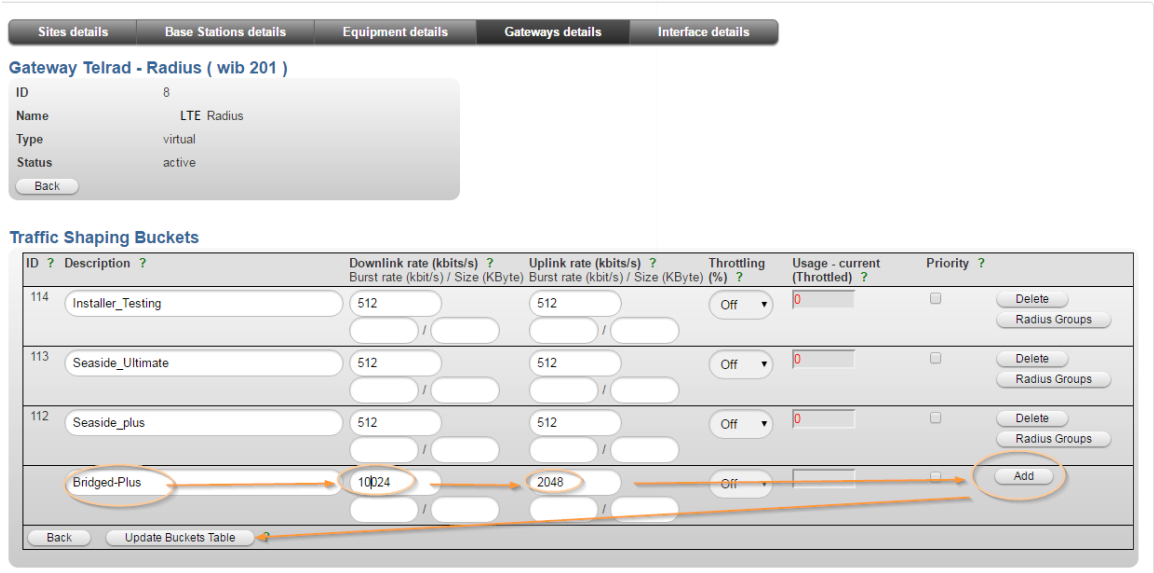


Fig. 7.6-6: Bucket Settings

- ***Step Seven:*** Navigate back to buckets page by clicking ***'Modify Buckets'*** button. (See Fig. 7.6-7).

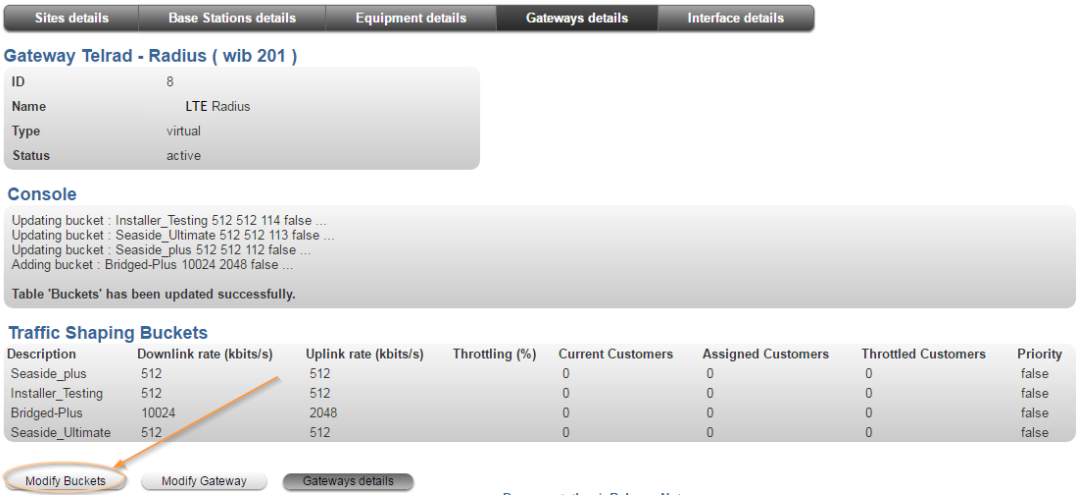


Fig. 7.6-7: Modify Buckets

- ***Step Eight***: Click on 'Radius Groups' button for the recently added bucket. (See Fig. 7.6-8).

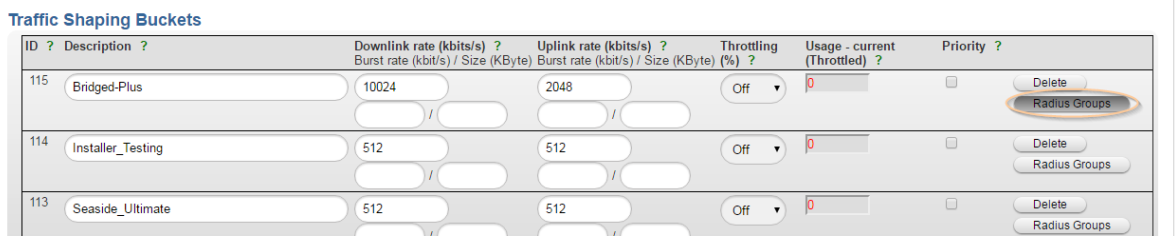


Fig. 7.6-8: RADIUS Groups Button

- ***Step Nine:*** In the console window please Click on the ***'Add'*** button. (See Fig. 7.6-9).

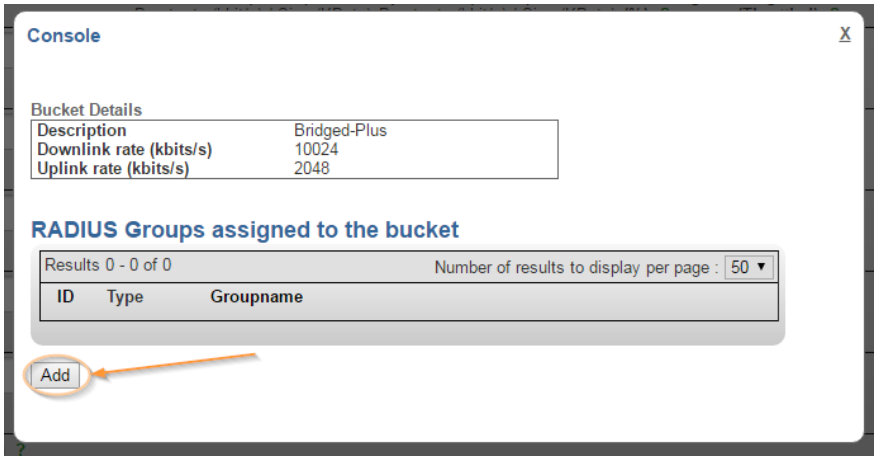


Fig. 7.6-9: Add RADIUS Groups to Bucket

- ***Step Ten:*** Pick the recently added RADIUS group name from dropdown, make sure that ***'Current'*** is set as the type and click on ***'Add'***. (See Fig. 7.6-10).

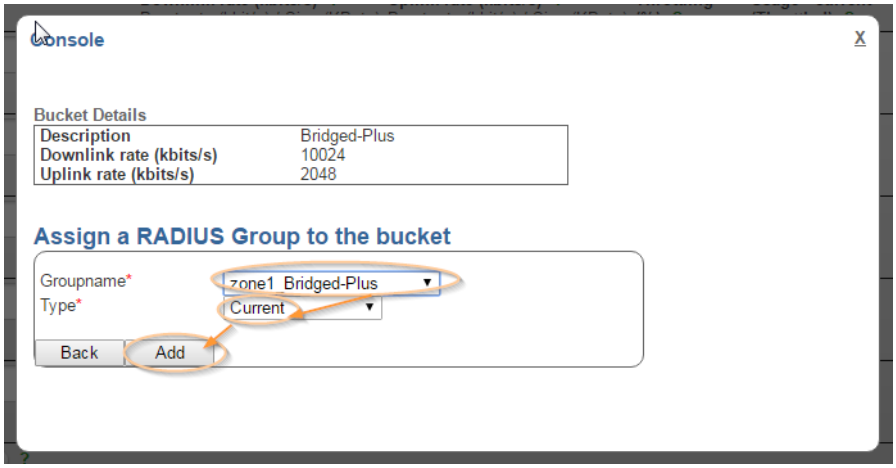


Fig. 7.6-10: Add RADIUS Group

- ***Step Twelve:*** Verify that the RADIUS group for current type assignment is listed on the summary window. This concludes the setup. (See Fig. 7.6-11).

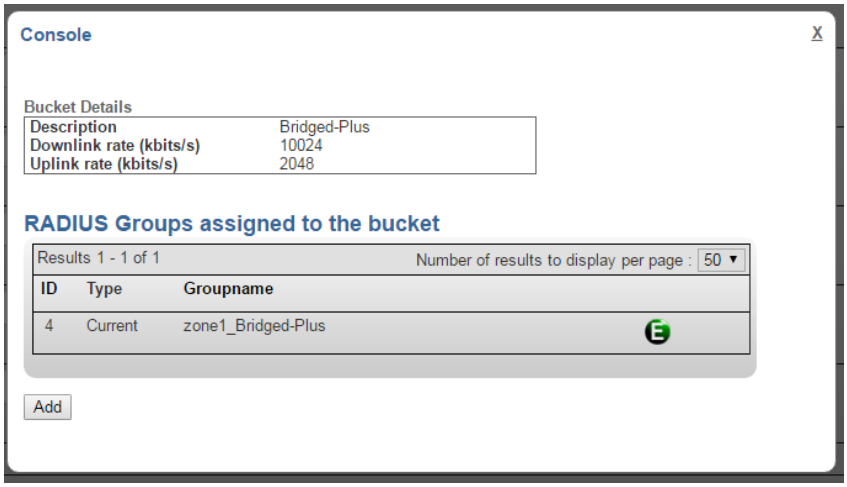


Fig. 7.6-11: Group Verification

8 BaiCells Integration

8.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and BaiCells (baicells.com) for LTE deployments.

Any LTE networks managed with the BaiCells EPC can be integrated with the Azotel SIMPLer platform. SIMPLer uses the API to synchronize customer accounts.

Customers are using LTE devices with SimCards inserted. In reality, it is the SIM Card details that actually are used to authenticate the customer on to the network – CPE's can be swapped upon failure – as long as the SimCard remains the same – it will be authenticated seamlessly after the swap. Upon authentication the CPE sends the SimCard details to LTE Access Point which forwards the SimCard identity to the BaiCells EPC. If a particular user (SIM Card) is set on the BaiCells EPC server – the CPE it is on will get authenticated to the network. At the moment the integration is limited by current API capabilities and unfortunately no usage / session figures are available in SIMPLer, but as Baicells are making progress in the development Azotel will keep adding features.

8.2 BaiCells trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

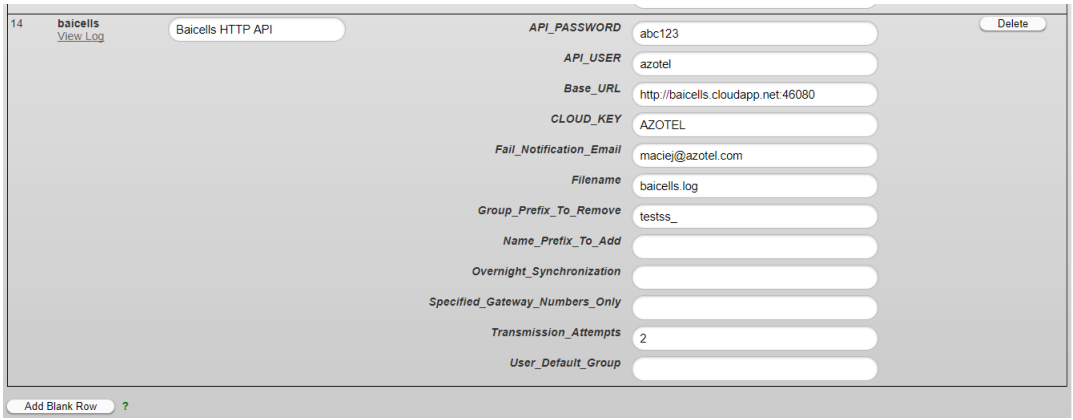
Before setting up BaiCells trigger, the below API access details must be obtained:

- ***API Base URL*** - this is the API URL that will be used by SIMPLer to communicate with i.e. http://baicells.cloudapp.net:46080
- ***API User*** – Username SIMPLer platform should send to authenticate with API
- ***API Password*** – Password related to the Username
- ***Cloud Key*** **–** Identifier of the operator cloud

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module:

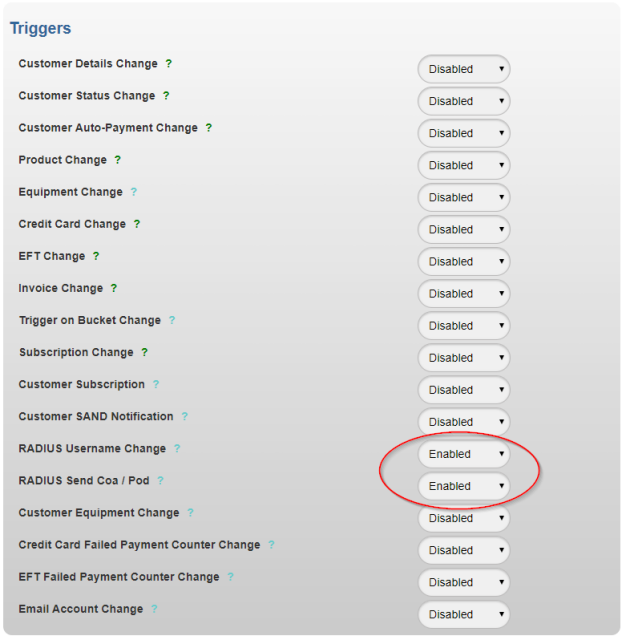
- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent to any location.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Group_Prefix_To_Remove*** – if defined, this option helps to remove any prefix from group attributes passed through the API. This typically would be set to 'operator_' to help remove automatically added 'operator_' prefix to each RADIUS group in SIMPLer.
- ***Overnight_Synchronization*** **–** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Baicells server. This is option is not recommended to use unless there are multiple communication issues between SIMPLer and Baicells API.
- ***User_Default_Group*** **-** profile group that is to be used for BaiCells EPC accounts that for whatever reason have no RADIUS group assigned to a customer account in SIMPLer.
- ***Name_Prefix_To_Add*** – a prefix that is to be added to a customer name pushed to BaiCells
- ***Specified_Gateway_Numbers_Only*** – this attribute allows operator to narrow down the trigger to selected gateways only
- ***Transmission_Attempts*** **–** this attribute specifies how many an API transmission should be retried upon communication failures



8.2.1 Example BaiCells API configuration entry

The Baicells integration requires triggers shown on the screenshot at Fig. 8.2.2 to be enabled as a part of the configuration process:

- ***RADIUS Username Change*** – enabling this trigger is required to synchronize SimCards assigned to customer accounts.
- ***RADIUS Send Coa / Pod*** – enabling this trigger is required to re-authenticate customer CPEs with new settings upon any account changes.



8.2.2 Example Baicells API configuration entry

8.3.1 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled, as the synchronization with the BaiCells Cloud Core server uses SIMPLer RADIUS to store synchronized accounts as well as to collet usage statistics.
- ***Bucket*** – Preferably mapped to a RADIUS group for automation purposes (i.e. changing QoS profile in BaiCells Cloud COre based on bucket the customer is assigned to).
- ***IMSI of SIMCard*** - added as a RADIUS Username – this is a simple way of doing things

  or alternatively

- ***SimCard*** – SimCard should have KI and OPCODE for the integration to work – unless there is already one set.

- ***CPE LTE*** – SimCard should be assigned to this LTE CPE – which will enable the synchronization module. It can be any LTE CPE type that is available in SIMPLer currently (Generic, BaiCells, Telrad).

Once the above conditions are met, the account from SIMPLer should be synchronized to the BaiCells Cloud Core server.

Note: In the case of equipment that was pre-imported to the system, once the process of assigning equipment to customers has been completed, any SIM Card account that was previously activated under the server as unassigned, will now take the correct settings from the customer account.

Below please find the steps required to set up a customer account in SIMPLer with both RADIUS Username Only or alternatively a SIM Card and an LTE CPE (recommended – as while at the moment pushing SIM Cards from SIMPLer is not available via API , over time this feature will also be added to the API – making customer account setup possible solely from SIMPLer) :

- **Step One**: Change the customer gateway to the 'Radius Enabled Gateway' (See Fig. 8.3-1) and change the bucket to whatever it should be for the particular customer, unless the bucket is subscription driven, in which case please make sure an appropriate subscription has been set under the customer account.

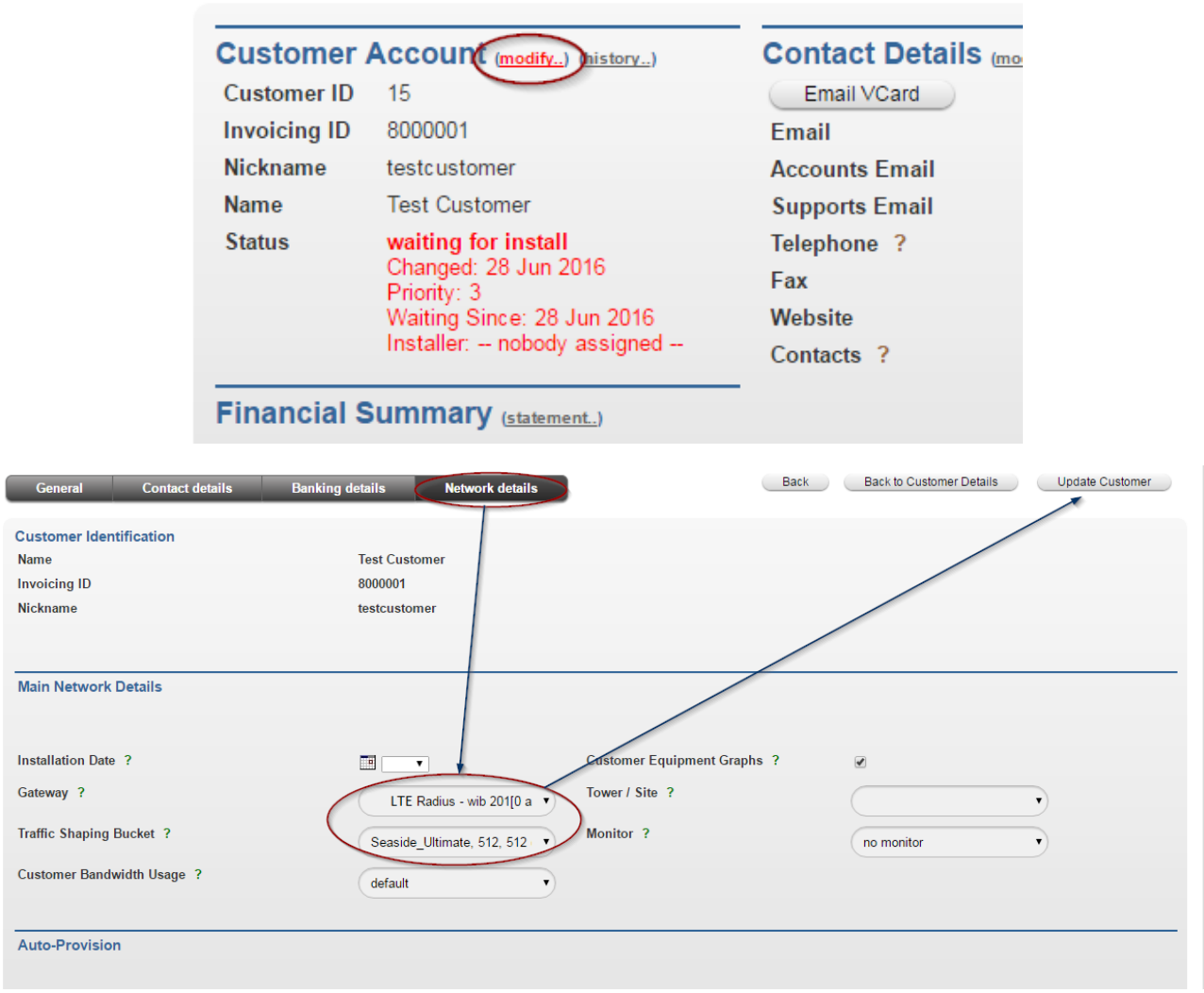


Fig. 8.3-1: BaiCells – Radius Bucket

- **Step Two:** Once the customer gateway / bucket changes have been submitted, a RADIUS subsection (highlighted in green on the screenshot at fig. 8.3-2) will appear under the network details on customer details page. Now there are two ways an IMSI can be added to a customer account:
    - Adding IMSI as a RADIUS Username – this is described in chapter 8.3.2
    - Adding SIM Card and LTE CPE – this is described in chapter 8.3.3

8.3.2 Adding SIM Card IMSI as a RADIUS Username

With current version of BaiCells API it is possible to use a simplified approach to adding SIM Cards IMSI as a RADIUS username to a customer account. Currently as BaiCells API does not support pushing SIM Cards and these need being pre-configured on the Cloud Core prior to being used in SIMPLer – there is no need to add SIM Cards directly to SIMPLer. Until adding SIM Cards is available via API – operator can opt out to use the simplistic approach as described in this chapter. Below find the steps to add a SIM Card IMSI as a Radius Username

- ***Step One:*** Click on 'modify' in the 'Radius Details' section of customer details page

Fig. 8.3.2-1: 'Radius Details' section of customer details page

- ***Step Two:*** Click on 'Customer Radius Usernames'

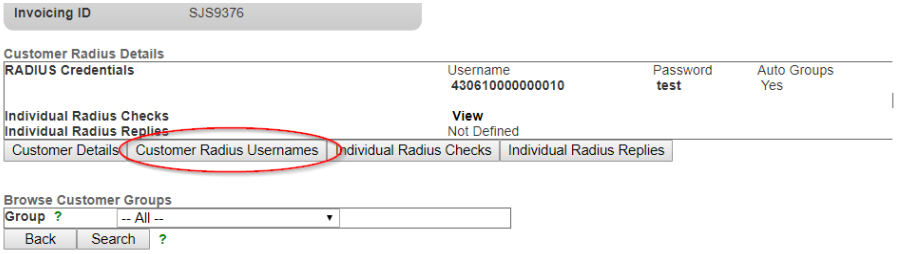


Fig. 8.3.2-2: 'Modify Radius Details' page section

- ***Step Three:*** Click on 'Add Blank Row' on the 'Customer Radius Usernames' page, than add the IMSI of the Sim Card to the Username field and submit this information by hitting the 'Update Table' button

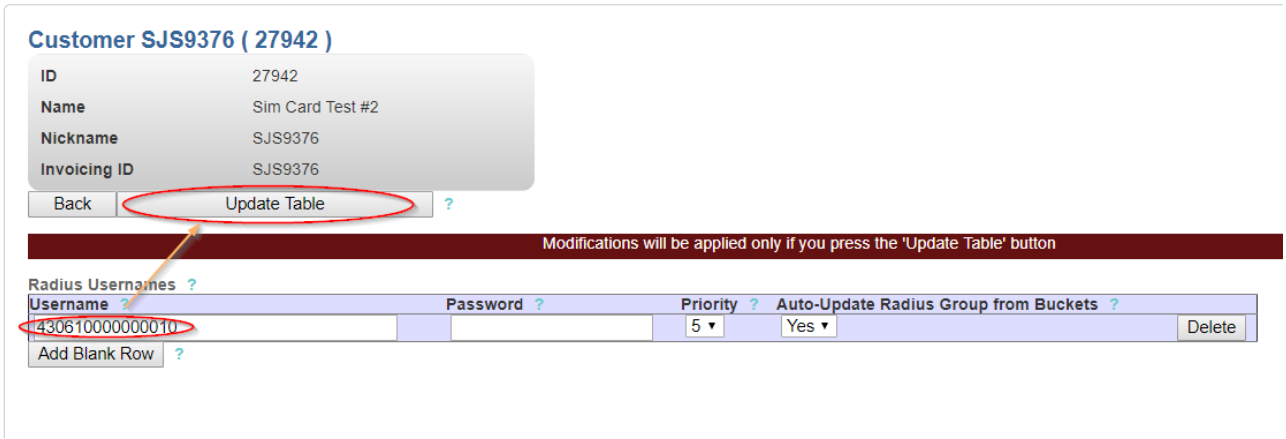


Fig. 8.3.2-3: Adding the IMSI as a RADIUS Username

8.3.3 Adding SIM Card and LTE CPE

- ***Step One:*** Click on the 'modify' link next to the Equipment Details. This takes the operator to the customer equipment management page. (See Fig. 8.3.3-1)

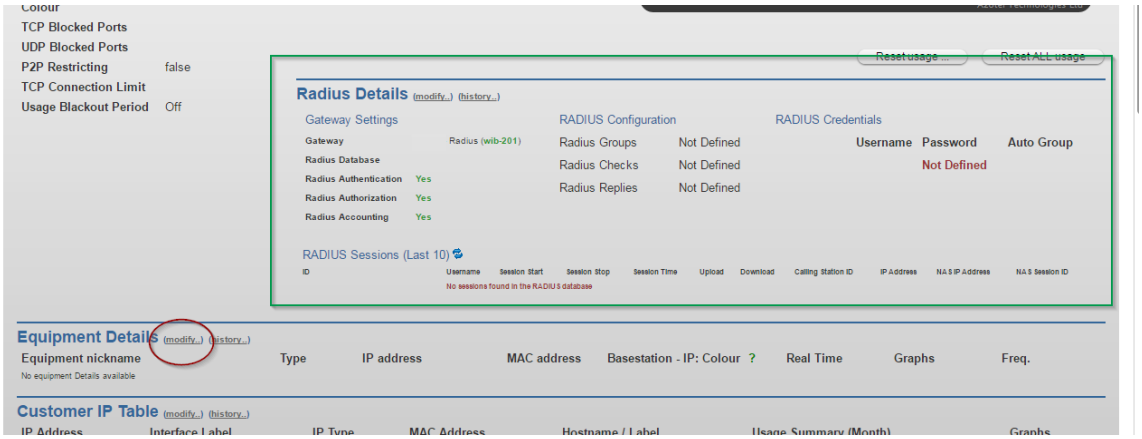


Fig. 8.3.3-1: Modify Equipment

- ***Step Two:*** Find both LTE CPE and SIM Card that the respective customer is using and click on the 'Add' button next to them to add them to the customer assigned equipment. All equipment in "stock" will be available for selection here. (See Fig. 8.3.3-2).

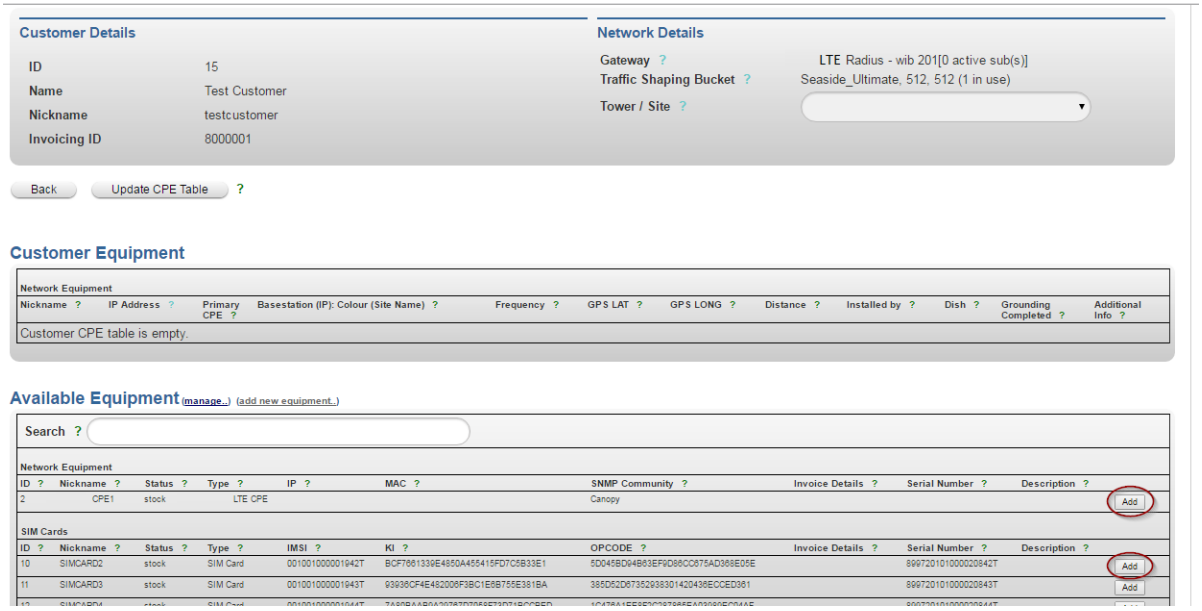


Fig. 8.3.3-2: Add Equipment

- ***Step Three:*** Once both the LTE CPE and SIM Card have been added to 'Customer Equipment', choose the recently added LTE CPE from the 'Equipment Attached to' dropdown in the SIM Cards section. This will tie the SIM Card to LTE CPE and allow for some additional automatons to be set i.e. the IP address displayed under the customer equipment will be automatically updated based on the IP currently attached to the SIM Card. (See Fig. 8.3.3-3).

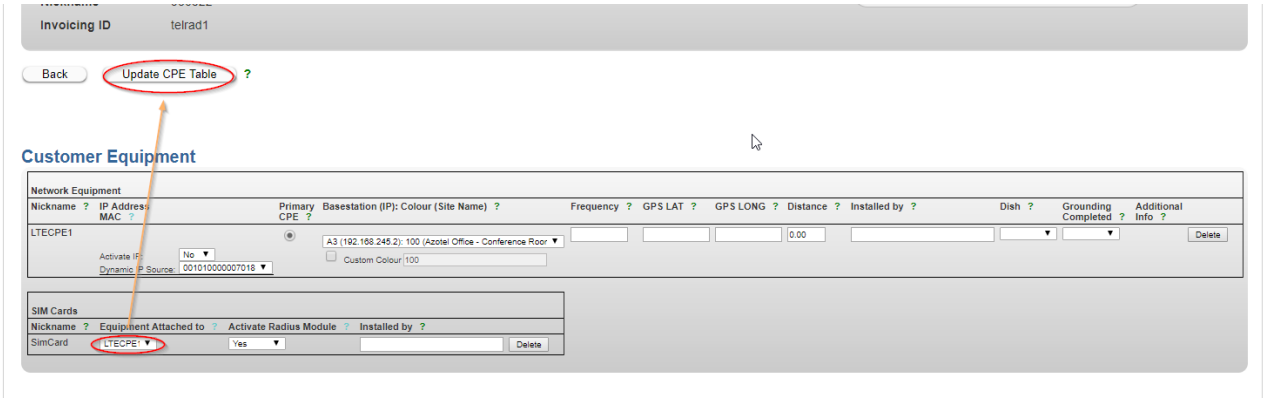


Fig. 8.3.3-3: Equipment Attachment

- ***Step Four:*** After the above step is completed, a RADIUS Details section will appear under customer details fully set with appropriate credentials (based on SIM Card IMSI attribute) as well as there will be two entries in the 'Equipment Details' table. (See Fig. 8.3.3-4).

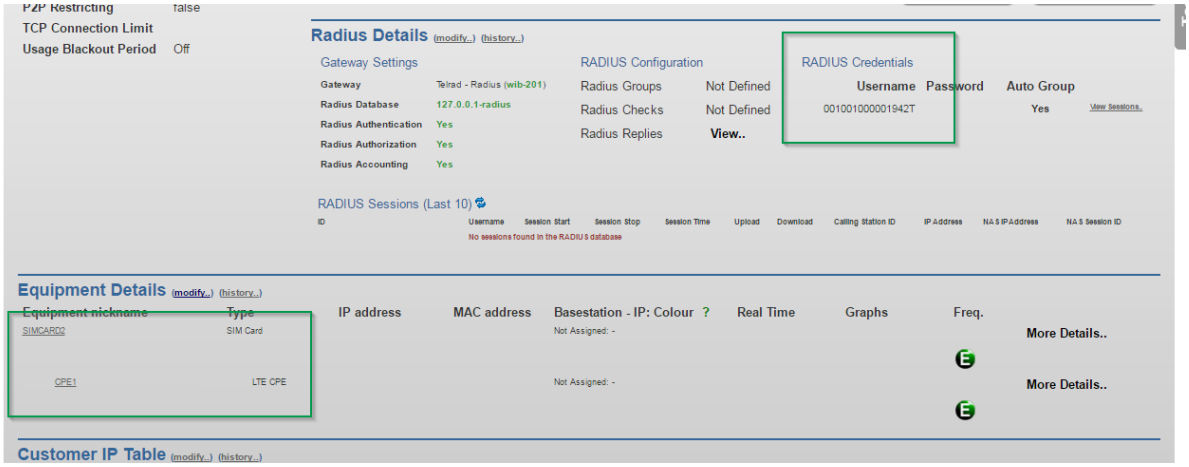


Fig. 8.3.3-4: RADIUS Credentials

- ***Step Five:*** The last step (optional) in the process of setting up a customer account is to add a static IP address to the customer account. Click on 'modify' button in the 'Customer IP Table' section of the Customer Details page. (See Fig. 8.3.3-5).

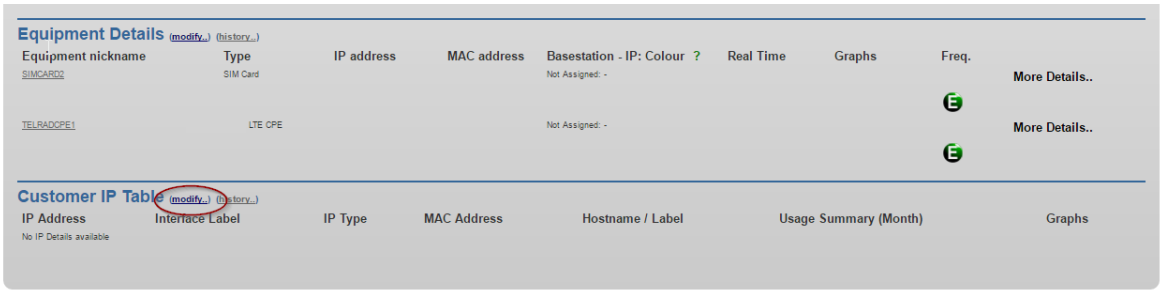


Fig. 8.3.3-5: Modify IP Address

- **Step Six**: Generate the IP address from our pre-defined IP Pools, or Define the IP address manually. Select the IMSI on the SIM Card from the 'RADIUS Username' dropdown. This will ensure that the IP address will be allocated to the LTE CPE via a RADIUS session off the Extenet EPC Server. (See Fig. 8.3.3.-6).

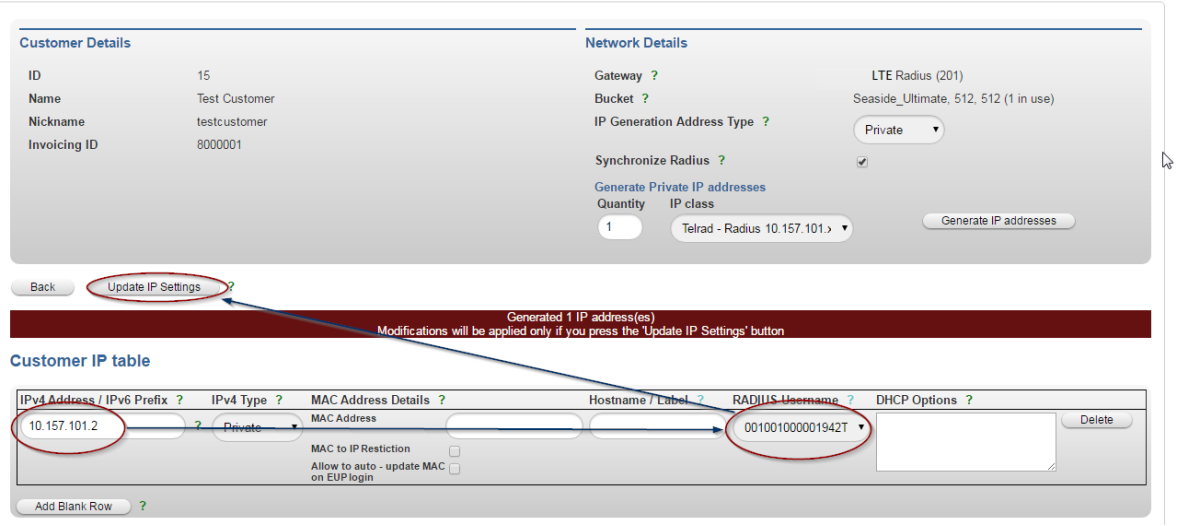
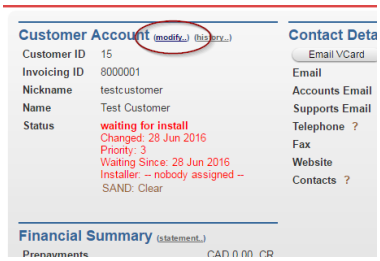


Fig. 8.3.3-6: Add IP Addresses

- **Step Seven**: Note that only 'current' customers will get access to the internet (and their CPE provisioned with the proper QoS as per the bucket). So it might make sense to change the customer account status to 'current' while installing. Accounts for customers in any other state than 'current' will be put into an 'activated' state at the Extenet EPC server.



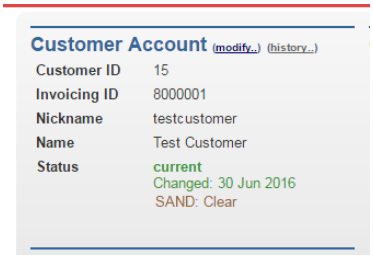


Fig. 8.3.3-7: Current Status

8.4 Buckets

Gateway Bucket definitions in SIMPLer can be synchronized with BaiCells automatically via the API. This only requires the ***'Bucket Change'*** trigger being enabled. Once this option is enabled, a service plan will be created for every bucket in SIMPLer as well as a service plan respective to an assigned bucket will be used for each customer account managed via API.

This mechanism should simplify greatly setup of "Quality of Service" settings.

Note: *Currently BaiCells API supports only 'Uplink rate' and 'Downlink rate' attributes for a service plan. Any other gateway bucket settings, such as 'Burst Rate', 'Throttling' or 'Priority' will be ignored.*

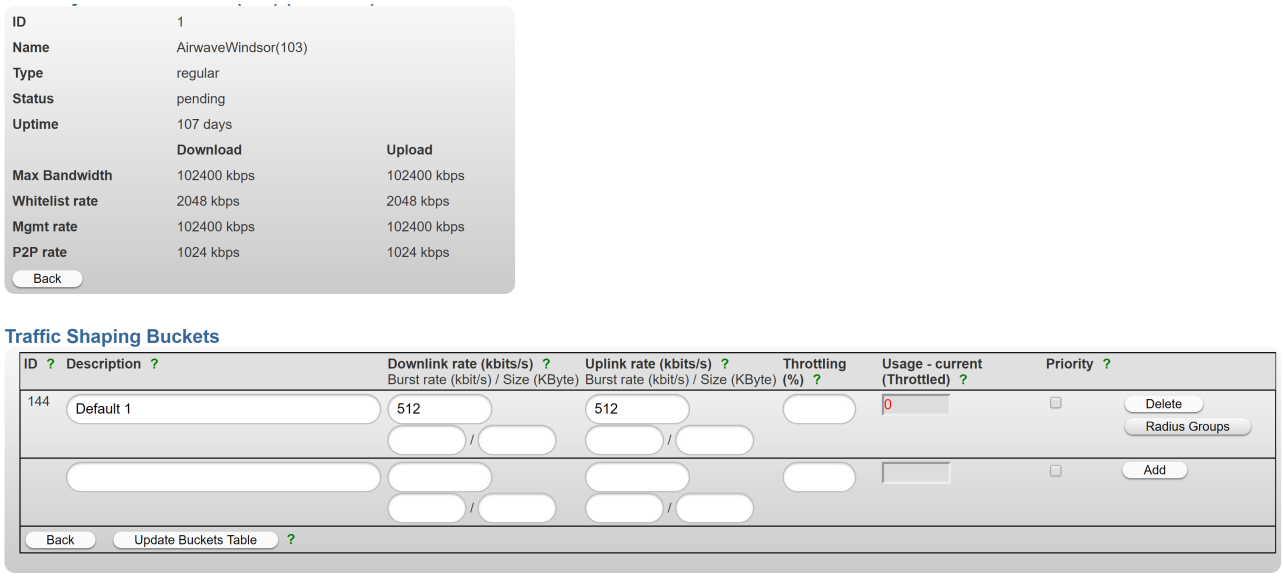


Fig. 8.4: 'Gateway Buckets' page

9 cnMaestro Integration

9.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and Cambium cnMaestro for automated equipment synchronization from cnMaestro to SIMPLer.

At the current stage of the cnMaestro API development it allows only to synchronize the equipment list back to SIMPLer, but as it progresses we are hoping to poll usage figures / synchronize equipment from SIMPLer to cnMaestro.

Equipment Synchronization process will periodically get a full equipment list and compare this against the equipment as exist in SIMPLer. Every piece of equipment whose MAC address does not already exist in SIMPLer will be added to a customer account in SIMPLer if it can be matched against it.

Important Note: The API is currently only available with the on-premises deployment (recent versions from 1.6.1). The cloud version of cnMaestro does not provide API functionality, but it might in near future.

9.2 cnMaestro trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

Before setting up cnMaestro trigger, the below API access details must be obtained – this process is described in the ***"cnMaestro RESTful API"*** document available from Cambium networks:

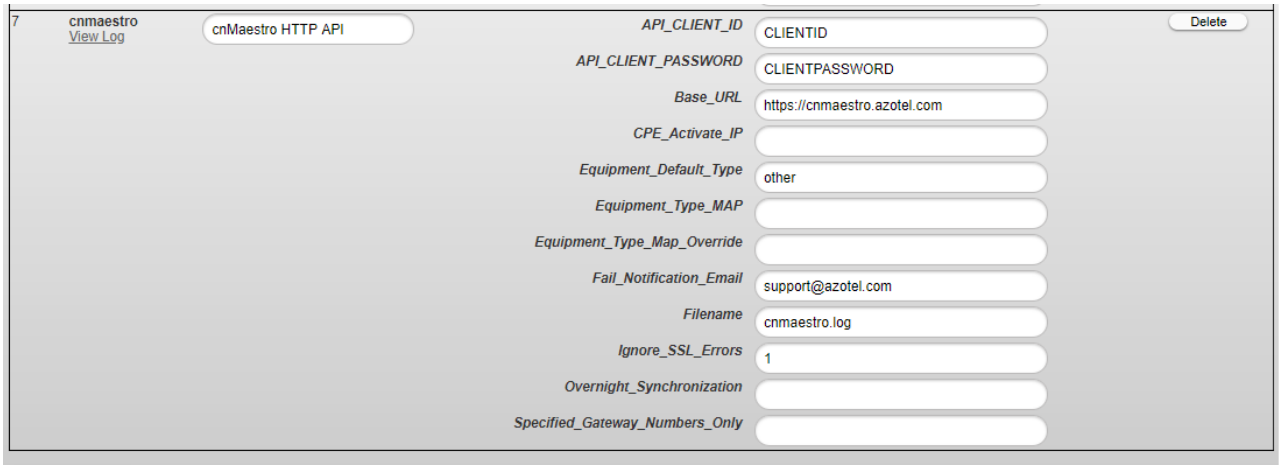
- ***Base URL*** - this is the API URL of the on-premise cnMaestro that will be used by SIMPLer to communicate with i.e. http://cnmaestro.azotel.com
- ***API CLIENT ID*** – Client ID SIMPLer platform should send to authenticate with API
- ***API CLIENT PASSWORD*** –Password related to the Client

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module:

- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent to any location.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization –*** enables overnight synchronization process if set to "1". If set – the equipment synchronization will happen overnight (there is alternative, preferred way to set it up as a cronjob in SIMPLer as it allows to specify execution time)
- ***Specified_Gateway_Numbers_Only*** – this attribute allows operator to narrow down the trigger to selected gateways only
- ***CPE_Activate IP*** – Should the equipment IP addresses be activated upon being added – this would allow it to be auto added and passed through WIB/NAS
- ***Equipment_Default_Type*** – default equipment type should there be no SIMPLer equipment type matching the product returned via API
- ***Equipment_Type_Map_Override*** – additional equipment map that could help map operator custom equipment types – format

`cnmaestroproduct1:::simplertype1///cnmaestroproduct2:::simplertype2`



9.2.1 Example cnMaestro API configuration entry

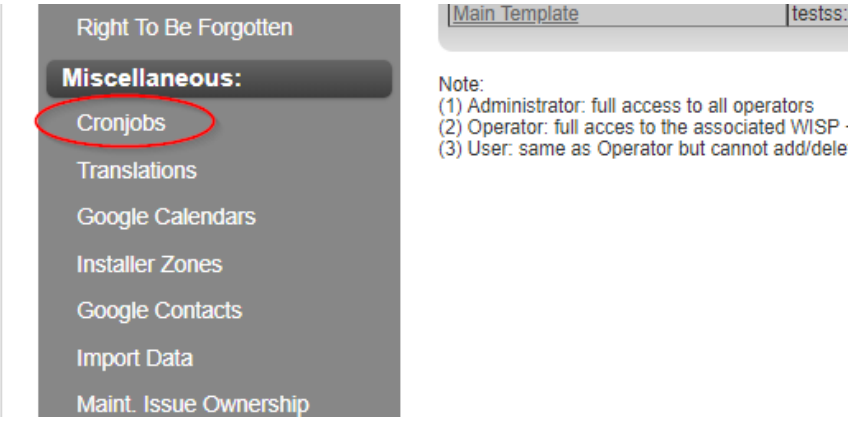
To enable equipment synchronization that is the sole trigger option currently supported by the cnMaestro API:

- Cronjob needs to be setup as described in the chapter 9.3 – this is preferred way of having it set
- Overnight Synchronization needs to be enabled – which will execute the synchronization overnight

9.3 Equipment Synchronization Cronjob setup

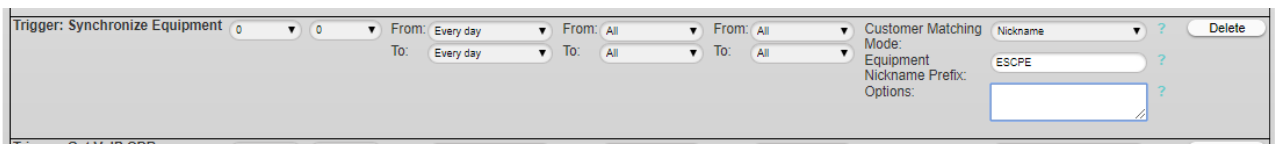
Equipment Synchronization trigger' script can be set from the cronjobs page available under Settings in SIMPLer.

9.3.1 SIMPLer "Settings" page



9.3.2 "Cronjobs" link under "Settings" page

Below described are optional attributes that can be set along with the background job:



9.3.3 Example "Synchronization Equipment" trigger setup

- ***Customer Matching Mode*** – this field defines how SIMPLer customers will be matched to equipment list returned from the cnMaestro API. The matching will be done over the 'managed account'.
    - ***Customer-ID –*** the managed account field in cnMaestro will have to be set specifically to 'Customer ID' in order to match the respective customer account in SIMPLer.
    - ***Custom-Field–*** the managed account field in cnMaestro will have to be set specifically to what the custom 'Equipment Identifier' field is in order to match the respective customer account in SIMPLer
    - ***Nickname–*** the managed account field in cnMaestro will have to be set specifically to 'Nickname' in order to match the respective customer account in SIMPLer
    - ***Nickname (brackets) –*** the managed account field in cnMaestro will have to contain a SIMPLer customers 'Nickname' field in brackets in order to match the respective customer account in SIMPLer i.e. [NICKNAME] Name Surname
- ***Equipment Nickname Prefix*** – each added equipment piece will have this particular prefix used to generate equipment nickname
- ***Options*** – this field is used for customization and shall be populated only by Azotel technician

10 Dashan Zhone ZMS Integration

10.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and Dashan Zhone ZMS (dasanzhone.com) for fibre deployments.

> *"ZMS is a standards-based, carrier-class network management solution that provides management support for DZS multi-service networks. The ZMS client-server architecture uses proven industry standard components such as an application server framework and a relational database to provide a robust platform. ZMS automates complex, tedious, and error-prone tasks, thereby raising productivity, improving accuracy, and reducing costs for operators."*
>
> *"ZMS is a full-featured management system including full FCAPS implementation (Fault, Configuration, Administration, Performance and Security). ZMS's FCAPS functionality enables quick turn-up of devices, advanced tools for increased productivity, real-time traffic and service monitoring and historical data collection for trending and analysis."*

SIMPLer integration with Dashan Zhone ZMS is concentrated around end customer faced equipment setup i.e., provisioning, managing the connection speed accordingly to the product customer is signed to, disconnecting/reconnecting customer, collecting usage from customer premises equipment (i.e., optical network terminals - ZNID ONT).

Note: Key thing to remember is that the ONT serial number is used as the key in SIMPLer to ZMS communication. An installer could scan the equipment barcode for the serial number and once added to customer account it would get provisioned automatically.

10.2 Dashan Zhone trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

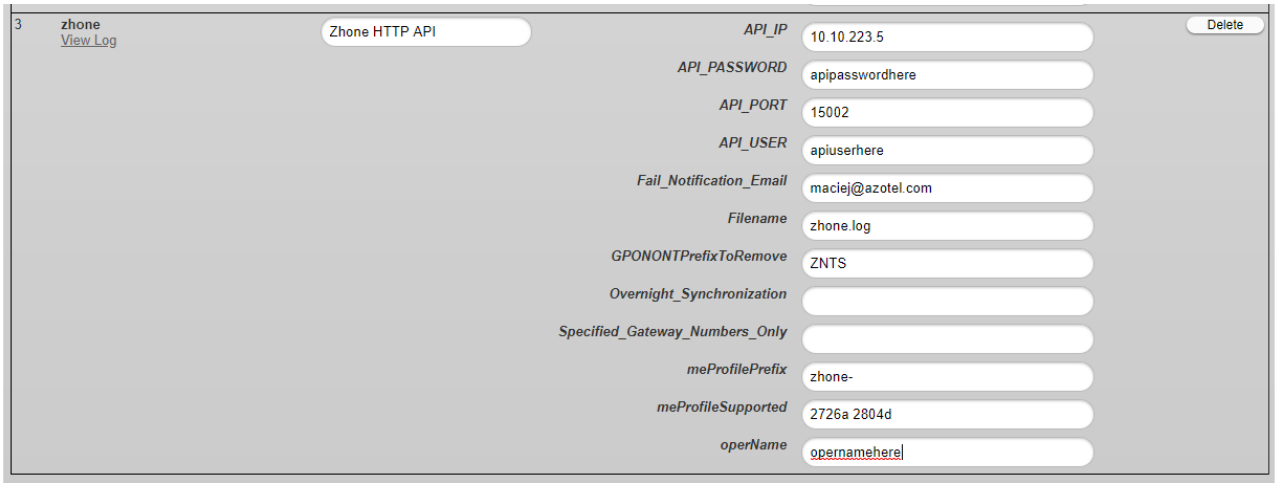
Before setting up Dashan Zhone trigger, the below API access details must be obtained:

- ***API_IP*** - this is the IP address of the Dashan Zhone ZMS API
- ***API_PORT –*** this is the PORT on which API is run (15002 by default)
- ***API_USER*** – Username SIMPLer platform should send to authenticate with API
- ***API PASSWORD*** – Password related to the Username
- ***operName*** – operName – third element (along with username, password) of API authentication credentials
- ***GPONONTPrefixToRemove*** – serial number prefix that will be used to "detect" ZHONE ONT units to provision. Only equipment with serial numbers starting with the specified prefix will be provisioned (default: ZNTS)
- ***meProfilePrefix*** – this prefix will be used to automatically create a meProfile based on the device type i.e. zhone-2726a for 2726a1 ONT. Defaults to 'zhone-'
- ***meProfileSupported*** – defines list of supported (existing meProfiles) – default: 2726a 2804d

Optional Settings:

Below listed is a set of additional attributes that can be defined for the API module:

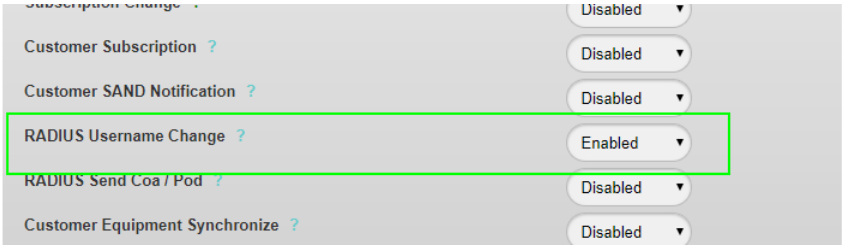
- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent to any location.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization*** – enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Zhone ZMS server. This is option is not recommended to use unless there are multiple communication issues between SIMPLer and Dashan Zhone ZMS API.
- ***Specified_Gateway_Numbers_Only*** – this attribute allows operator to narrow down the trigger to selected gateways only



10.2.1 Example Dashan Zhone API configuration entry

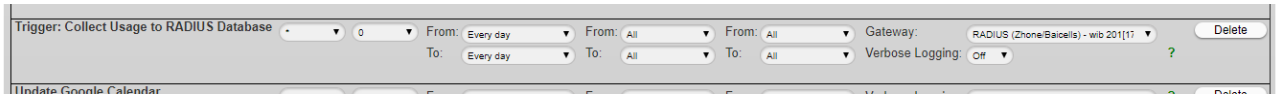
The Dashan Zhone integration requires triggers shown on the screenshot at Fig. 10.2.2 to be enabled as a part of the configuration process:

- ***RADIUS Username Change*** – enabling this trigger is required to synchronize the ONT assigned to customer accounts.



10.2.2 Example Dashan Zhone ZMS API configuration entry

Usage figures can be polled with Dashan Zhone ZMS API. To setup automated polling of usage figures a cronjob needs to be set.



10.2.3 Usage polling trigger setup in Cronjobs

10.3.1 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled, as the synchronization with the Zhone ZMS server uses SIMPLer RADIUS to store synchronized accounts as well as to collect usage statistics.

- ***Bucket*** – must be mapped to a 'Zhone' RADIUS group for provisioning purposes (i.e. provisioning ports of ONT as well as changing QoS profile in Zhone ZMS is based on bucket the customer is assigned to).
- ***Serial Number of ONT*** - added as a RADIUS Username

  or alternatively

- ***Zhone ONT*** – added to customer equipment (RADIUS Username will be automatically populated from the ONT's serial number)

Once the above conditions are met, the account from SIMPLer should be synchronized to the Zhone ZMS server.

Below please find the steps required to set up a customer account in SIMPLer with both add a ZNID ONT (recommended) or alternatively RADIUS Username Only:

- **Step One**: Verify customer is assigned to / Change the customer gateway to the 'Radius Enabled Gateway' (See Fig. 10.3-1) and change the bucket to whatever it should be for the particular customer, unless the bucket is subscription driven, in which case please make sure an appropriate subscription has been set under the customer account.

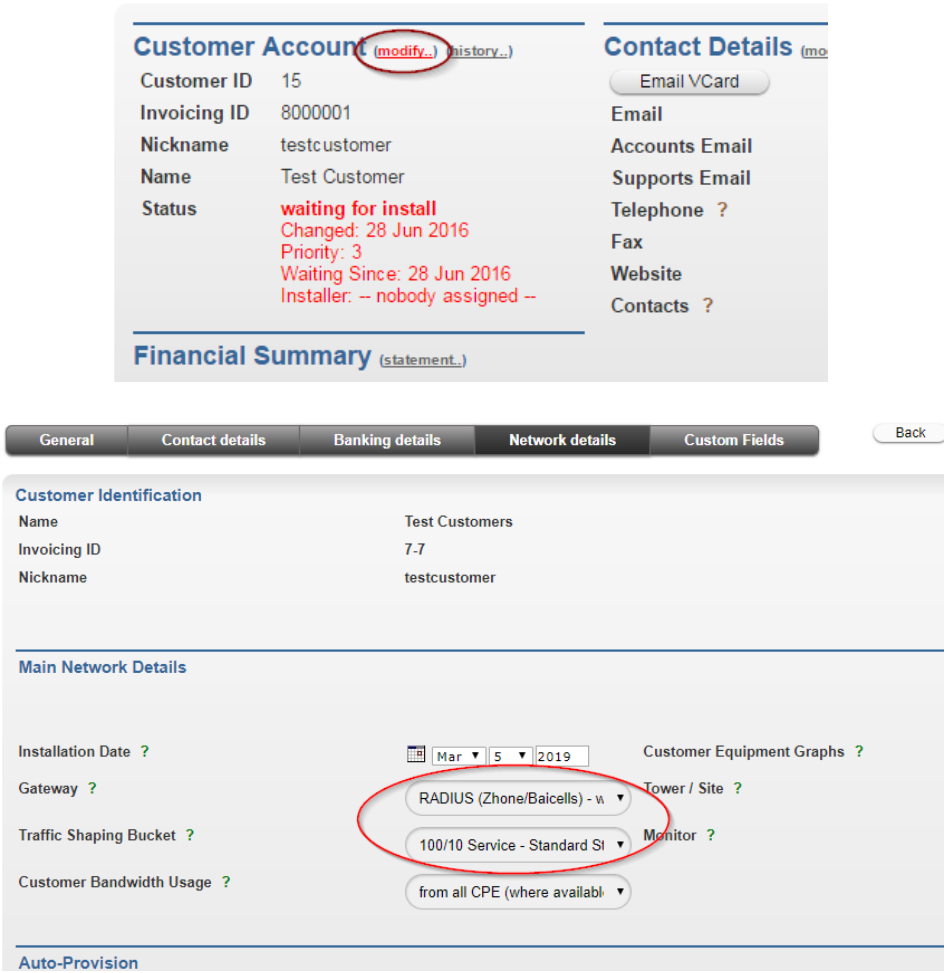


Fig. 10.3-1: Zhone ZMS – Radius Gateway / Bucket setup

- **Step Two:** Once the customer gateway / bucket changes have been submitted, a RADIUS subsection (fig. 10.3.2-1) will appear under the network details on customer details page. Now there are two ways an GPON ONT serial number can be added to a customer account for provisioning:
  - Adding ZNID GPON ONT equipment to customer account (recommended) – this is described in chapter 10.3.2
  - Adding GPON ONT serial number as a RADIUS Username – this is described in chapter 10.3.3

10.3.2 Adding ZNID GPON ONT

- ***Step One:*** Click on the 'modify' link next to the Equipment Details. This takes the operator to the customer equipment management page. (See Fig. 10.3.2-1)

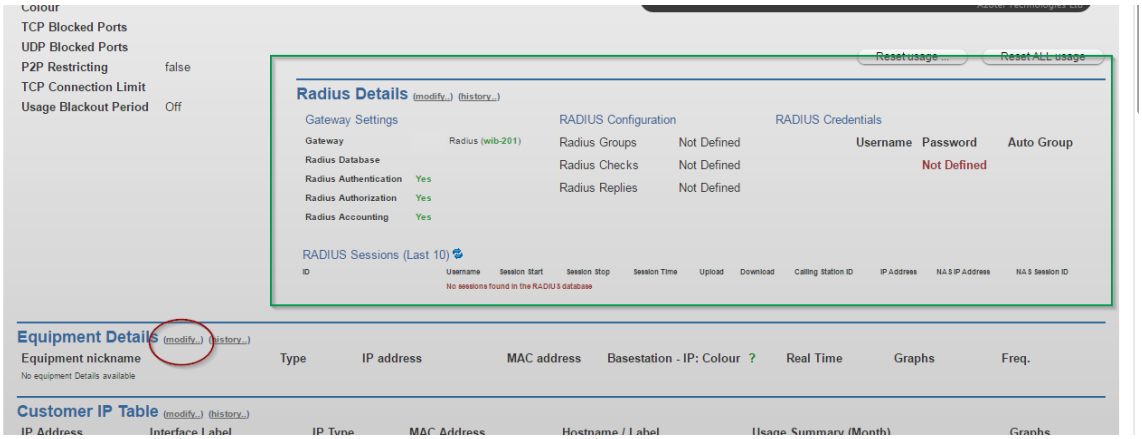


Fig. 10.3.2-1: Modify Equipment

- ***Step Two:*** Find the ZNID ONT that the respective customer is using and click on the 'Add' button next to them to add them to the customer assigned equipment. All equipment in "stock" will be available for selection here. (See Fig. 10.3.2-2). Submit by clicking "Update CPE Table" button

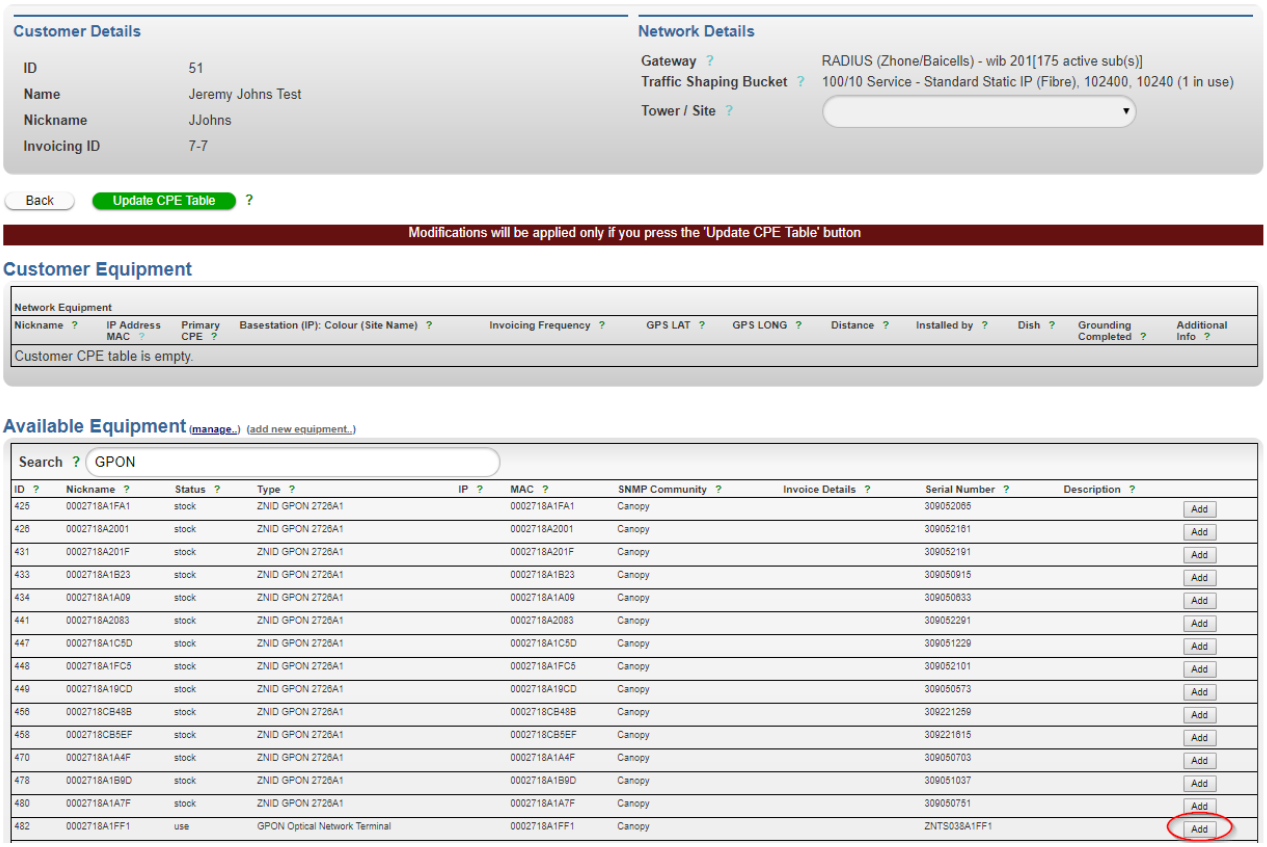


Fig. 10.3.2-2: Add Equipment

- ***Step Three:*** After the above step is completed, a RADIUS Details section will appear under customer details fully set with appropriate credentials (based on GPON ONT serial number) as well as there will be a new entry in the 'Equipment Details' table. (See Fig. 10.3.2-3).

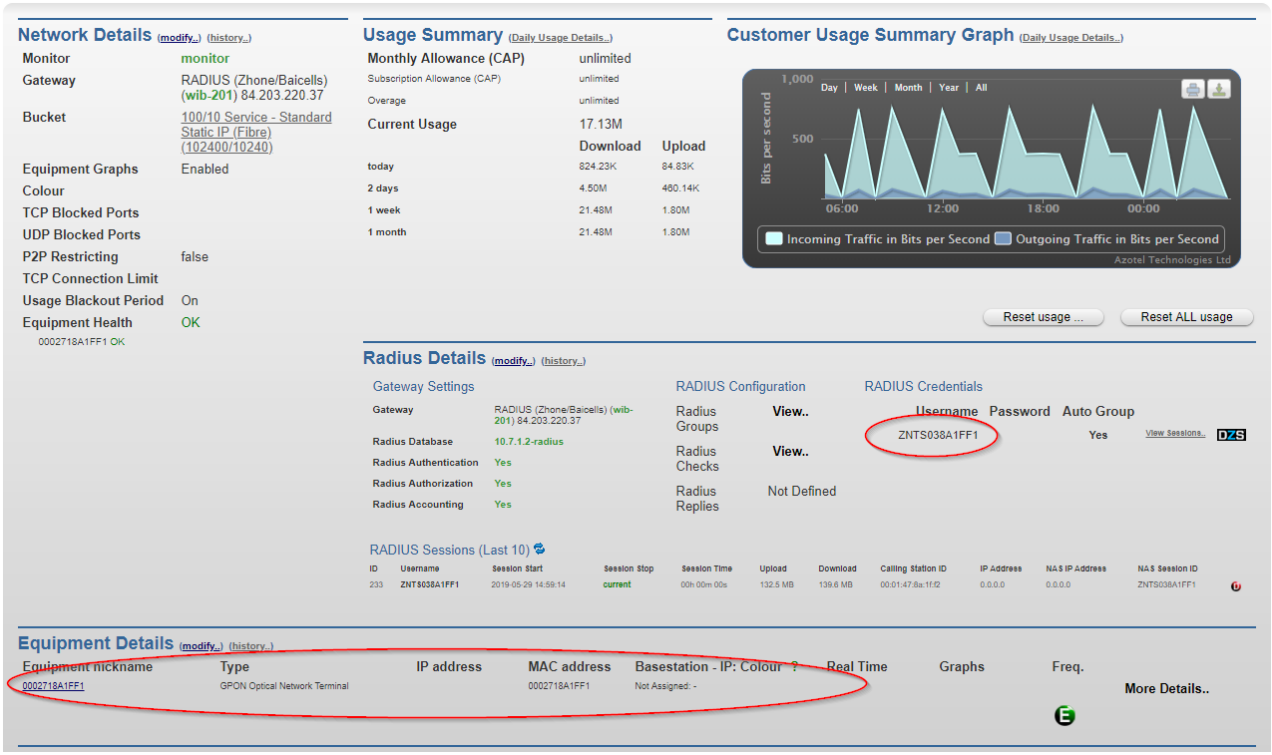
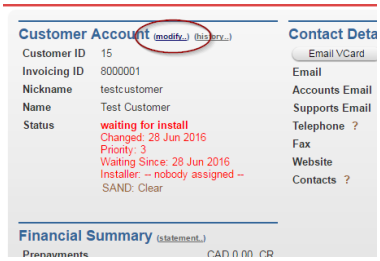


Fig. 10.3.2-3: RADIUS Credentials

- **Step Four**: Note that only 'current' customers will get access to the internet (and their GPON PNT provisioned with the proper QoS as per the bucket). So it might make sense to change the customer account status to 'current' while installing.



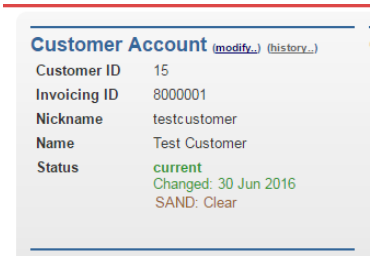


Fig. 10.3.2-7: Current Status

10.3.3 Adding GPON ONT serial as a RADIUS Username

Below find the steps to add a GPON ONT serial number as a Radius Username.

Note that while what is described in this chapter allows achieving same results we would still recommend provisioning as described in 10.3.2 chapter.

- ***Step One:*** Click on 'modify' in the 'Radius Details' section of customer details page

Fig. 10.3.3-1: 'Radius Details' section of customer details page

- ***Step Two:*** Click on 'Customer Radius Usernames'

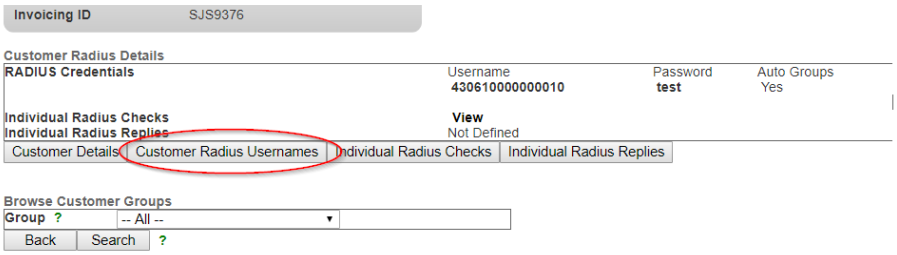


Fig. 10.3.3-2: 'Modify Radius Details' page section

- ***Step Three:*** Click on 'Add Blank Row' on the 'Customer Radius Usernames' page, than add the Serial Number of the ONT to the Username field and submit this information by hitting the 'Update Table' button

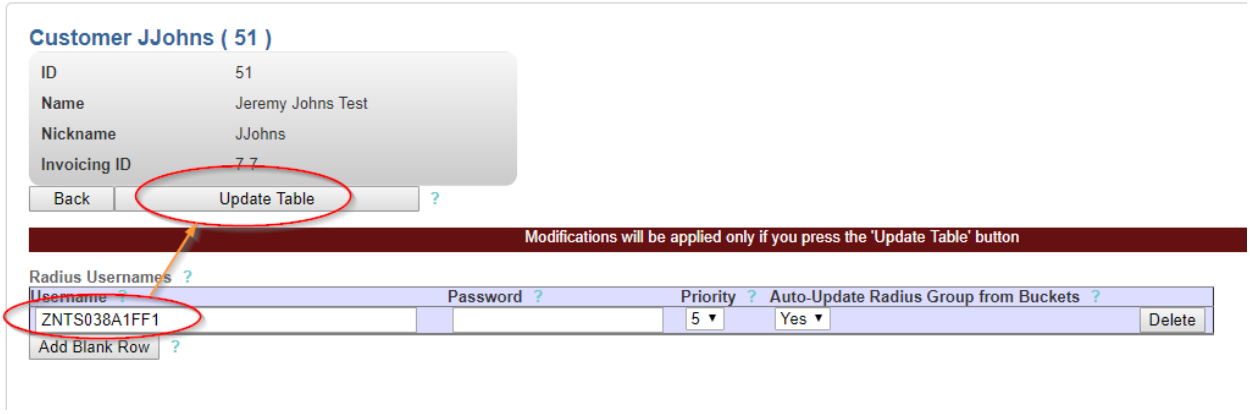


Fig. 10.3.3-3: Adding the Serial Number as a RADIUS Username

10.3.4 Voice provisioning – Customer Account setup

Below find the steps on how to add, modify and delete voice accounts.

- ***Step One:*** From the customer account, at the bottom of the screen, go to the Customer Custom Tables Section. Information can be manually edited by clicking 'modify'.

  Click 'Add Blank Row' and enter in the information. Multiple rows can be added by clicking 'Add Blank Row'. Once complete click 'Update Table'.

  Should you wish to modify an entry, click 'modify' from the customer account page Customer Custom Tables section, make your changes, and click 'Update Table'.

To delete an entry, click ‘modify’ from the customer account page Customer Custom Tables section, then click ‘delete' on the row that you no longer require and click ‘Update Table’.

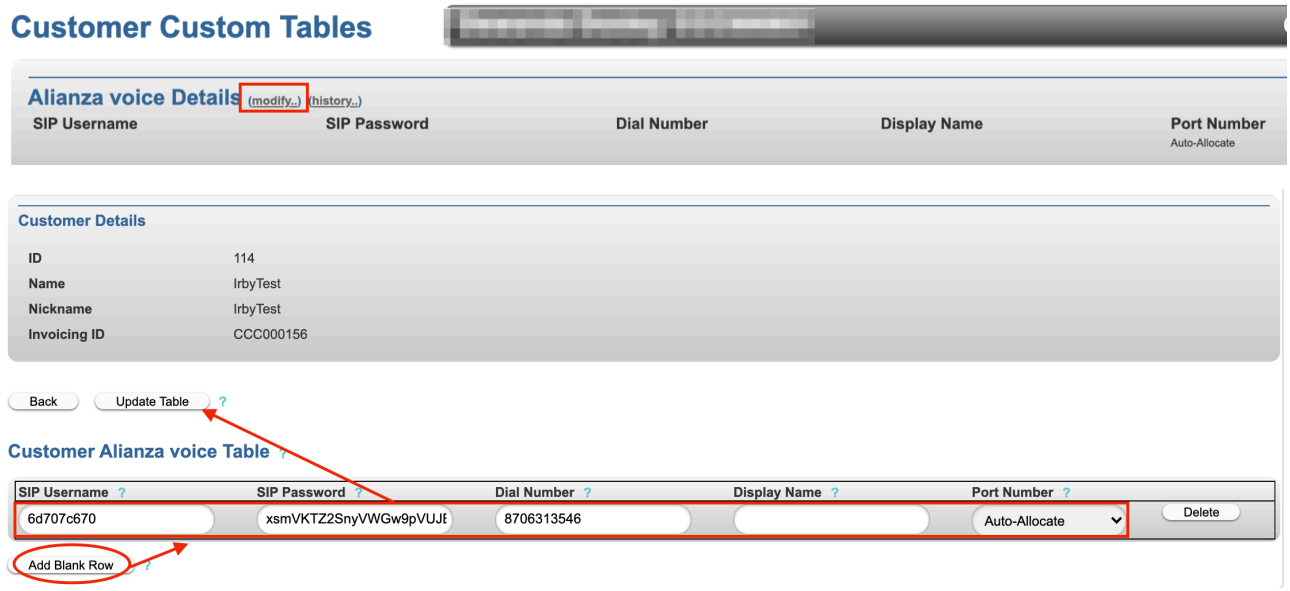


Fig 10.3.4-2: Add, Modify or Delete Voice Details on Customer Account

10.4 Buckets / Voice Setup

RADIUS groups attached to gateway define how the GPON ONT is provisioned.

Customer Custom Tables are required for voice provisioning.

Both of these need to be carried out by Azotel engineers. Do please get in touch with Azotel to discuss your requirements to get these set up.

11 Calix Management System Integration

11.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and Calix Management System (calix.com) for fibre deployments.

> *"Service Delivery and Assurance in the access network is critical for service providers business success. The ability to manage the full lifecycle of access services is table stakes for telco and MSOs when deploying deep fibre services. The Calix Management System (CMS) provides a rich set of tools for network and service configuration, surveillance, performance and administration. CMS enables network and business transformation by delivering legacy services over copper, as well as next generation IP and Ethernet services over fibre and wireless access. CMS also integrates with the Compass Suite of Software applications to provide a truly integrated cloud solution for service lifecycle management.*
>
> *CMS Features:*
>
> *CMS delivers full Fault, Configuration, Accounting, Performance and Security (FCAPS) for the complete suite of Calix Unified Access network devices. The CMS functions include:*
>
> - *Service configuration and global service profile management*
> - *Network configuration of both physical and virtual network deployments*
> - *Surveillance, real time and historical alarm and event reporting and alarm forwarding*
> - *CMS and network element configuration backup and restore*
> - *Authentication, Authorisation and Accounting for services as well as network and CMS users*
> - *Full FCAPs support for E7-2 (EXA), E7-20, B6 and C7"*

SIMPLer integration with Calix Management System is concentrated around end customer faced equipment setup i.e., provisioning, managing the connection speed according to the product the customer is assigned to, and disconnecting/reconnecting the customer.

Note: The key thing to remember is that the ONT serial number is used as the key in SIMPLer to CMS communication. An installer could scan the equipment barcode for the serial number and once added to customer account it would be provisioned automatically.

11.2 Calix trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page.

Mandatory Settings:

Before setting up the Calix trigger, the below API access details must be obtained:

- ***API_HOST*** - this is the IP address of the Calix API
- ***API_PORT –*** this is the PORT on which the API is available (18080 by default)
- ***API_USER*** – Username SIMPLer platform should send to authenticate with the API
- ***API PASSWORD*** – Password related to the Username
- ***URI_AE_ONT*** – URI to submit the AE queries. Should be left as default (/cmsae/ae/netconf)
- ***URI_C7_E3_E5-100*** – URI to submit the C7/E3/E5-100 queries. Should be left as default (/cmsweb/nc)

- ***URI_E7*** – URI to submit the E7 queries. Should be left as default (/cmsexc/ex/netconf)
- ***ONT_Description*** – Description that should be pushed to Calix from SIMPLer. It is flexible and allows using any of the customer details including custom fields. By default Azotel sets it to customer name i.e. %%name%%
- ***ONT_Subscriberid*** – Subscriberid that will be pushed to Calix from SIMPLer. It is flexible and allows using any of the customer details including custom fields. By default Azotel sets it to customerid i.e. %%customerid%%
- ***Nodename_Prefix*** – nodename prefix. Unless something changes in the API with newer releases it should be left as default i.e. "NTWK-"
- ***Nodename_Customer_Field*** – customer field (required!) under which nodename is stored

Optional Settings:

Listed below are a set of additional attributes that can be defined for the API module:

- ***Fail_Notification_Email*** – email address where emails notifying any API communication failures should be sent. Notification emails will only be sent if this option is defined.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization*** – enables overnight synchronization process if set to "1". During this synchronization all customer records are re-synchronised with the Calix server. This option is not recommended unless there are multiple communication issues between SIMPLer and the Calix API.
- ***Specified_Gateway_Numbers_Only*** – this attribute allows an operator to narrow down the trigger to selected gateways only.

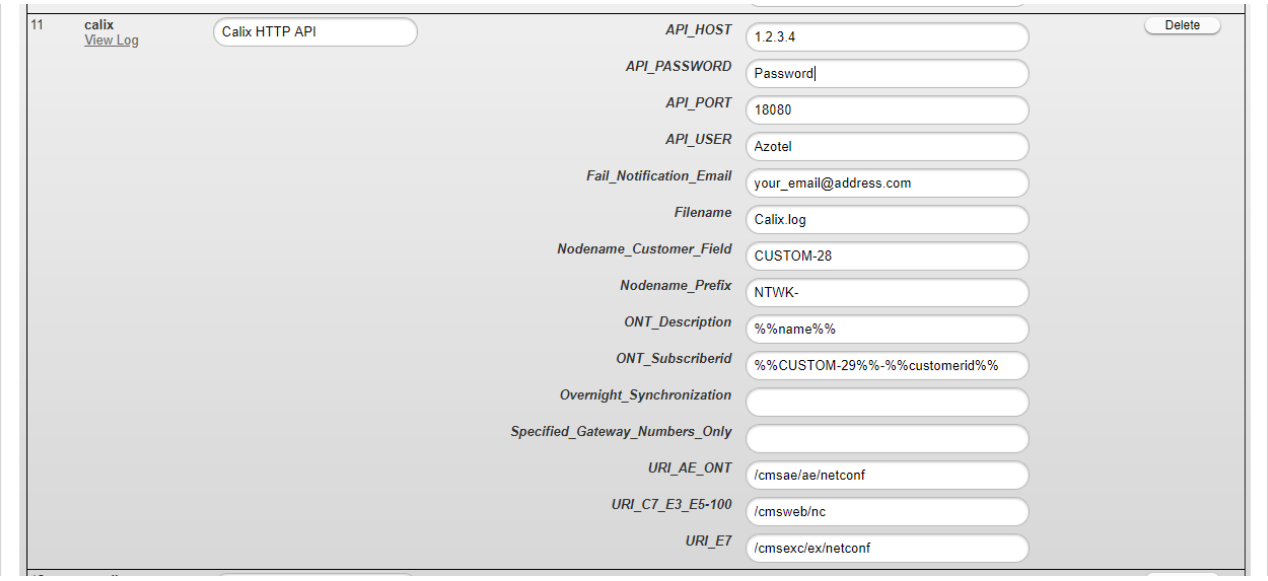


Fig. 11.2.1 Example Calix API configuration entry

The Calix integration requires triggers to be enabled as a part of the configuration process (Fig. 11.2.2):

- ***RADIUS Username Change*** – enabling this trigger is required to synchronise ONT assigned to customer accounts.

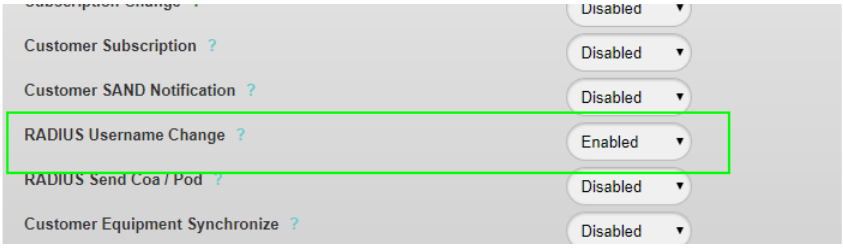


Fig. 11.2.2 Example Calix API configuration entry

Usage figures cannot be polled with the Calix Management System API as the feature is not supported by Calix yet. Once it is added to the API it will be added to the integration module.

11.3.1 Customer Account Setup

A correctly set up and working customer account will have the following details configured under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled. Synchronization with the Calix server uses the SIMPLer RADIUS to store synchronized accounts as well as to collect usage statistics.
- ***Bucket*** – The bucket must be mapped to a 'Calix' RADIUS group for provisioning purposes. Provisioning ports of the ONT as well as changing the QoS profile in the Calix CMS is based on which bucket the customer is assigned to.
- ***Serial Number of ONT*** – This is added as a RADIUS Username

  or alternatively

- ***Calix ONT*** – This can added to the customer equipment (RADIUS Username will automatically be populated from the ONT's serial number)

Once the above conditions are met, the account from SIMPLer should be synchronized to the Calix CMS server.

Below please find the steps required to set up a customer account in SIMPLer with both add an ONT (recommended) or alternatively RADIUS Username Only:

- **Step One**: Verify that the customer is assigned to, or change the customer gateway to, the 'Radius Enabled Gateway' (Fig. 11.3-1) and change the bucket to whatever it should be for that customer. However, if the bucket is subscription driven, ensure that an appropriate subscription has been set under the customer account.

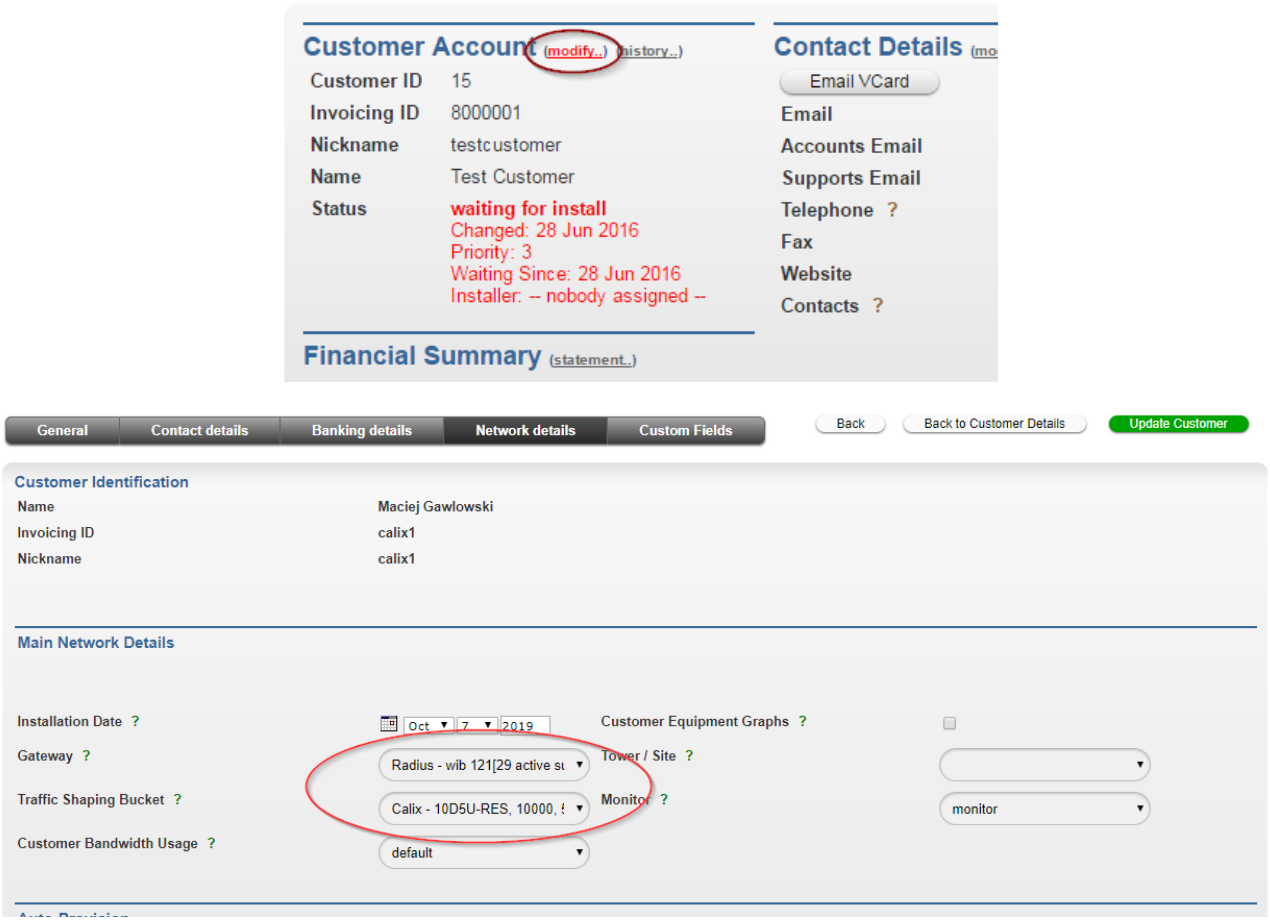


Fig. 11.3-1: Calix CMS – Radius Gateway / Bucket setup

- **Step Two:** Once the customer gateway and bucket changes have been submitted, a "Radius Details" subsection (Fig. 11.3.2-1) will appear under the network details on the customer page.

There are two ways an ONT serial number can be added to a customer account for provisioning:

- Adding ONT equipment to a customer account (recommended) – this is described in chapter 11.3.2
- Adding ONT serial number as a RADIUS Username – this is described in chapter 11.3.3

11.3.2 Adding ONT to a Customer Account (recommended)

- ***Step One:*** Click 'modify' next to the Equipment Details. This takes the operator to the customer equipment management page (Fig. 11.3.2-1)

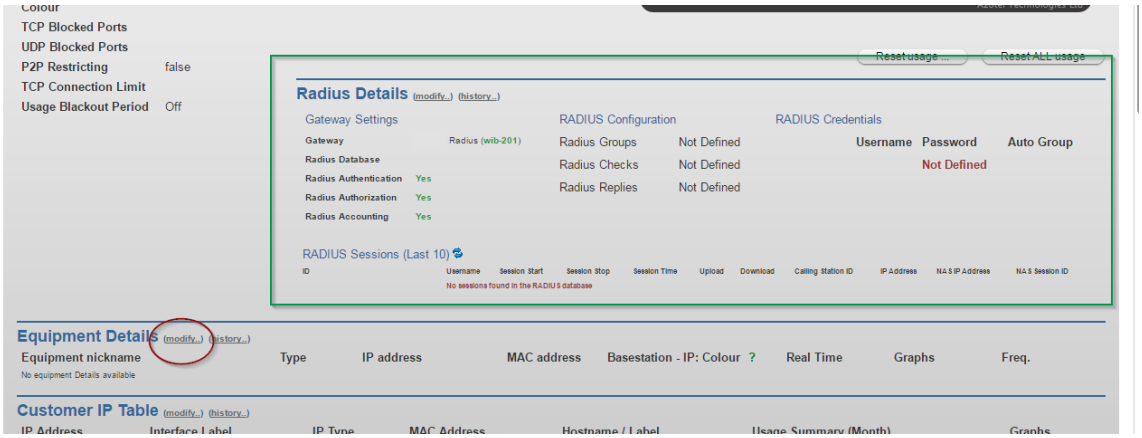


Fig. 11.3.2-1: Modify Equipment

- ***Step Two:*** Find the ONT that the respective customer is using and click 'Add'. This will add it to the equipment assigned to the customer. All equipment in "stock" will be available for selection here. (Fig. 11.3.2-2). Submit by clicking "Update CPE Table"

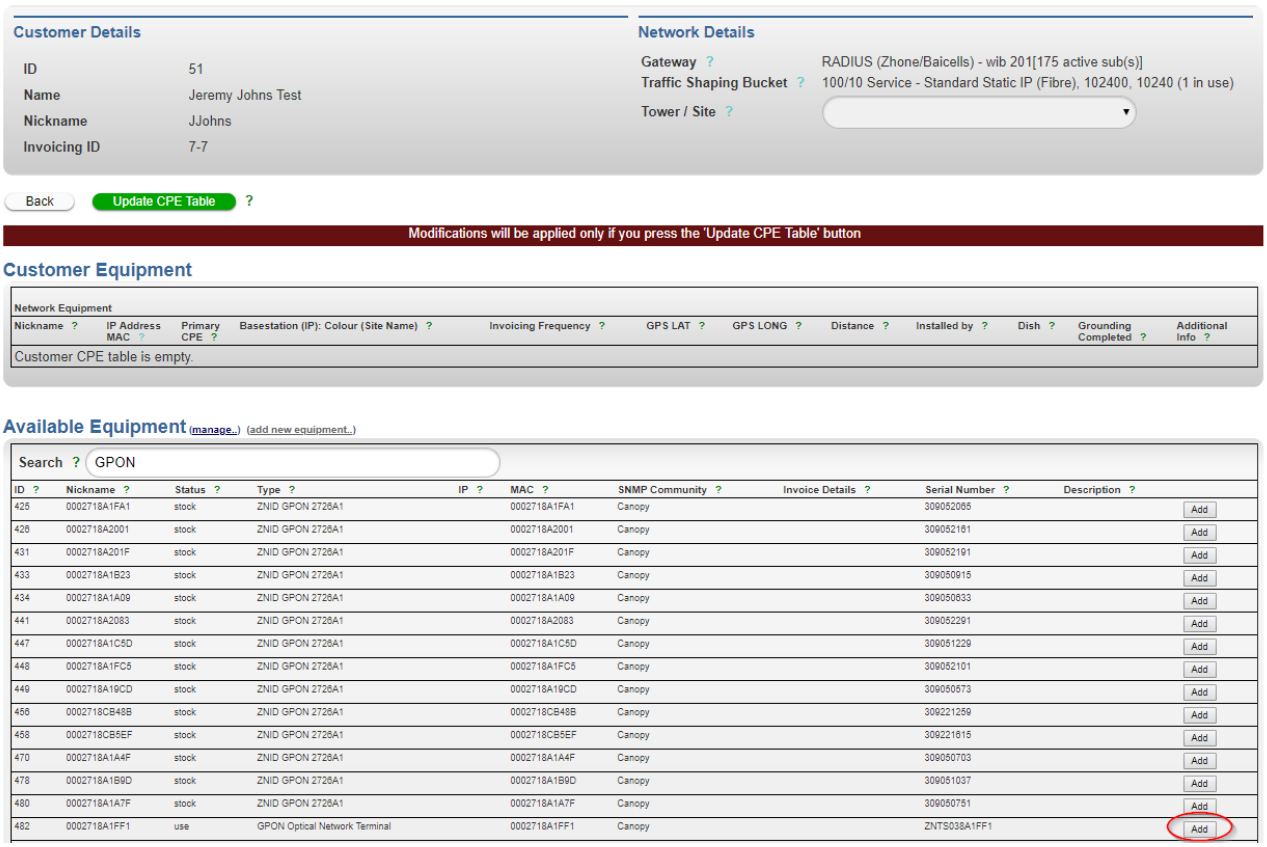


Fig. 11.3.2-2: Add Equipment

- ***Step Three:*** After the above step is completed, a RADIUS Details section will appear under the network details on the customer page. This should be set with appropriate credentials based on the ONT serial number. There will also be a new entry in the 'Equipment Details' table (Fig. 11.3.2-3)

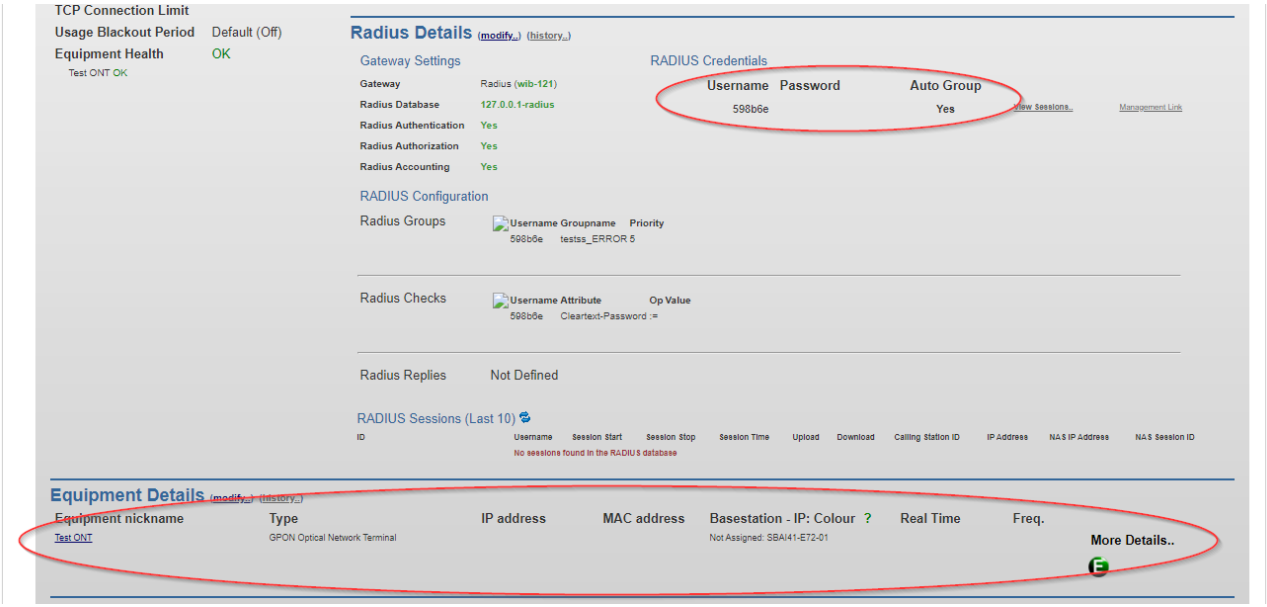


Fig. 11.3.2-3: RADIUS Credentials

- **Step Four**: Note that only 'current' customers will have access to the internet and their ONT will be provisioned with the proper QoS as per the bucket. For this reason an operator should change the customer account status to 'current' while installation is taking place

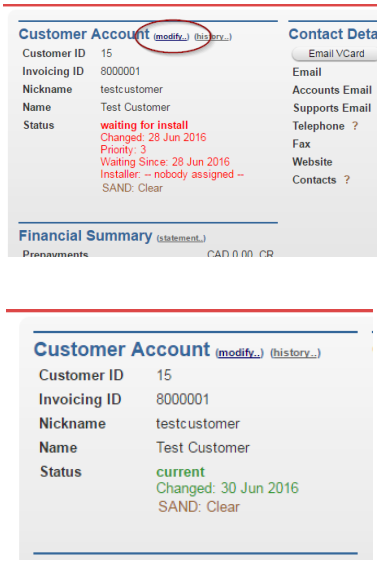


Fig. 11.3.2-7: Current Status

11.3.3 Adding ONT serial number as a RADIUS Username

Note that while what is described below is another way that an ONT serial number can be added to a customer account for provisioning we still recommend provisioning as described in chapter 11.3.2.

- ***Step One:*** Click 'modify' in the 'Radius Details' section of the relevant customer's page

Fig. 11.3.3-1: 'Radius Details' section of customer page

- ***Step Two:*** Click 'Customer Radius Usernames'

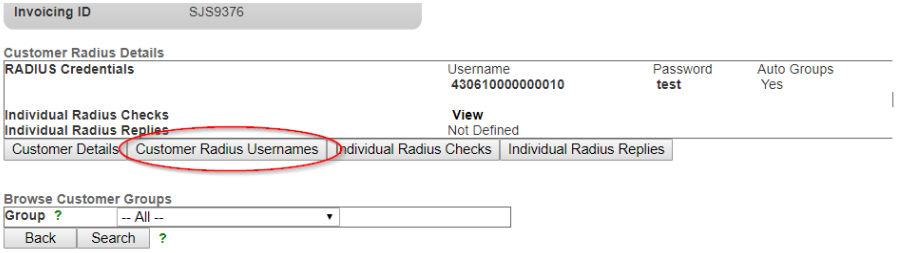


Fig. 11.3.3-2: 'Modify Radius Details' page section

- ***Step Three:*** Click 'Add Blank Row' then add the ONT serial number to the Username field and submit this by clicking 'Update Table'

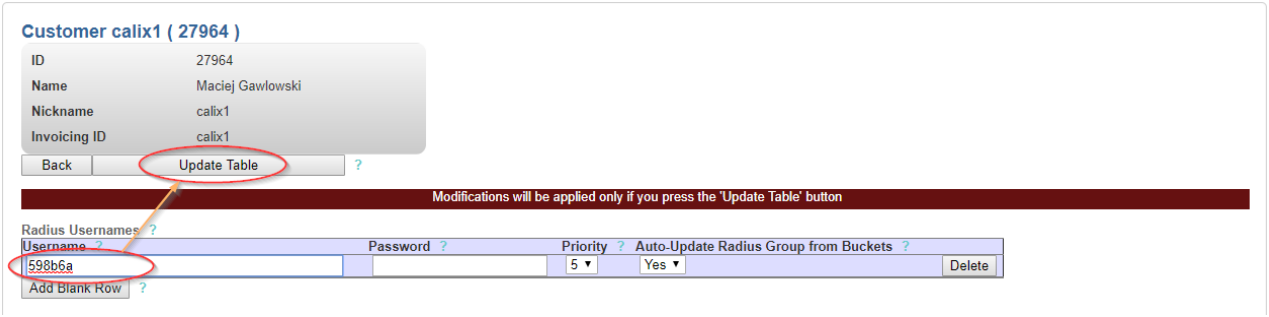


Fig. 11.3.3-3: Adding the Serial Number as a RADIUS Username

11.4 Buckets

RADIUS groups attached to a gateway define how the ONT is provisioned. This setup needs to be carried out by Azotel engineers. Please get in touch with Azotel to discuss your requirements.

12 Felix Management System Integration

12.1 Introduction

This section will provide a general outline of the integration available between SIMPLer and Felix Management System (.alea-soluciones.com) for Huawei fibre and PPPoE based deployments.

> *"Felix is a friendly interface, multi-user and multi-device ONT provisioning software tool that provides comprehensive management for GPON networks. It encompasses the management of Digital TV, Internet and Telephony under the same interface.*
>
> *It allows an efficient provision of the commercial services and products that the operator has created for its clients. It allows abstracting from the low level of configuration of complex and heterogeneous machines, systems or environments. It configures FTTH networks at a high level with Data, Telephony and TV services, both IPTV and RF Overlay ."*

SIMPLer integration with Felix Management System allows completing all aspects of ONT/PPPoE provisioning, managing the connection speed, telephony and TV services according to the products the customer is assigned to, and disconnecting/reconnecting the customer.

Note: The key thing to remember is that the ONT serial number is used as the key in SIMPLer to Felix API communication. Therefore an installer could scan the equipment barcode for the serial number and once added to customer account it would be provisioned automatically as per products a customer account is subscribed to.

12.2 Felix trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page.

Mandatory Settings:

Before setting up the Felix trigger, the below API access details must be obtained:

- ***API_BASE_URI*** - this is the base of the URI API calls are to be submitted with
- ***API_USER*** – Username SIMPLer platform should send to authenticate with the API
- ***API_PASSWORD*** – Password related to the Username
- ***External_Id_Prefix*** – SIMPLer will use the 'External ID' field in Felix to store SIMPLer customer account reference (Customer ID). This configuration field can be used to add a prefix to a Customer ID i.e. if 'CID' was used in this field example External ID can look as follows CID122314
- ***Subscription_Configuration_Cutom_FieldId*** – this field defines which product custom field is to be used as an additional source of Felix API configuration strings. Using this approach allows to drive parts of configuration from customer subscriptions
- ***Takeover_Existing_CPE*** – this field defines what SIMPLer should do if equipment exists in the Felix platform already. If blank – the API communication will stop upon detecting pre-existing equipment in Felix. That equipment will have to be deleted from Felix first otherwise SIMPLer will not push it via API. If this setting is set to 1 – SIMPLer will take over that equipment piece and either:
    - ***Take over existing customer account in Felix*** – in cases where it only has one equipment piece assigned
    - ***Remove equipment piece from existing Felix customer and then create a new customer account*** – if there was more than one equipment piece associated to Felix customer account

Optional Settings:

Listed below are a set of additional attributes that can be defined for the API module:

- ***Fail_Notification_Email*** – email address where emails notifying any API communication failures should be sent. Notification emails will only be sent if this option is defined.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization*** – enables overnight synchronization process if set to "1". During this synchronization all customer records are re-synchronized with the Felix platform. This option is not recommended unless there are multiple communication issues between SIMPLer and the Felix API.
- ***Specified_Gateway_Numbers_Only*** – this attribute allows an operator to narrow down the trigger to selected gateways only.

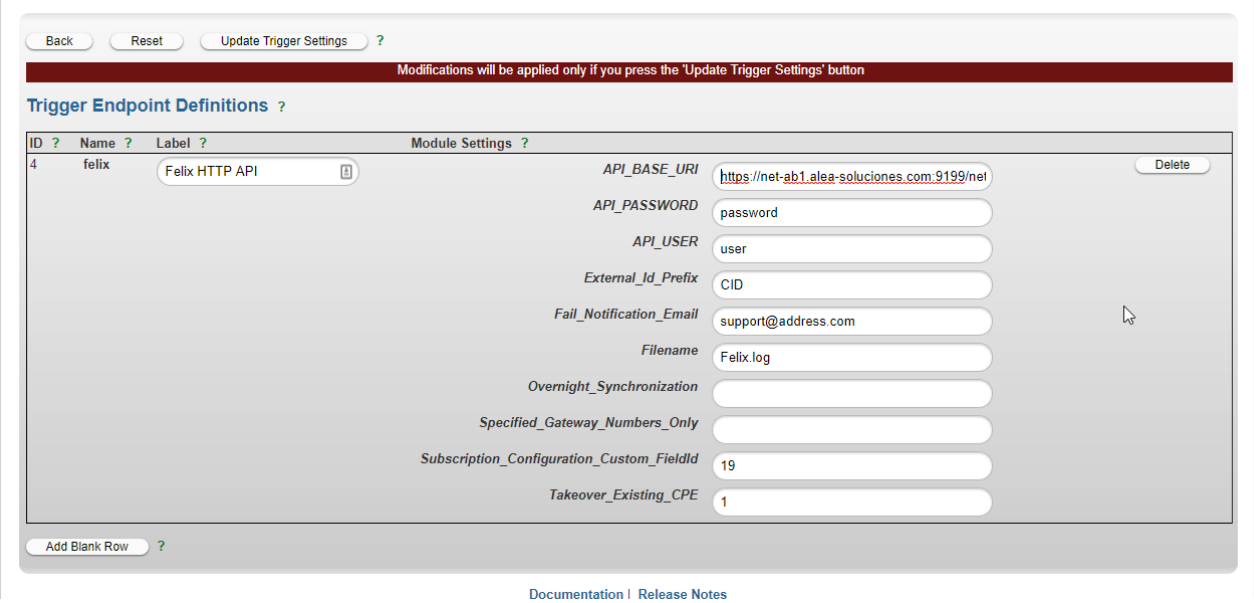


Fig. 12.2.1 Example Felix API configuration entry

The Felix integration requires triggers to be enabled as a part of the configuration process (Fig. 12.2.2):

- ***RADIUS Username Change*** – enabling this trigger is required to synchronize Huawei ONT's assigned to customer accounts.

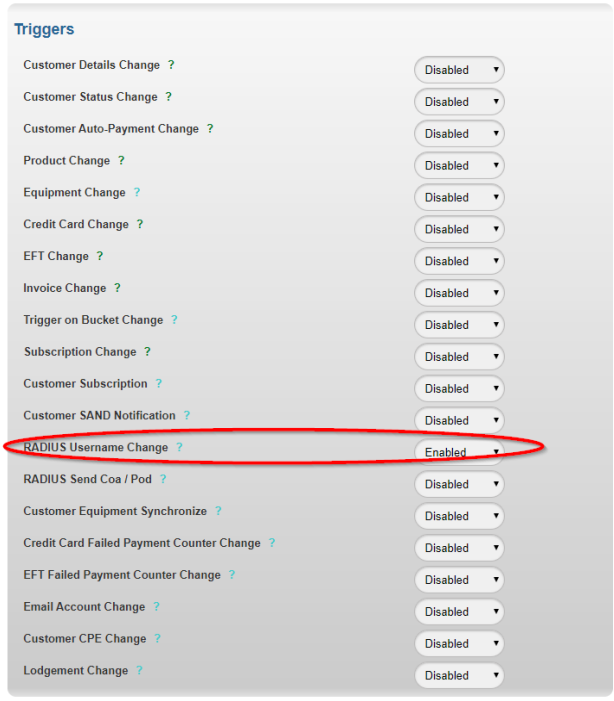


Fig. 12.2.2 RADIUS Username Change enabled

Note: Usage figures cannot be polled with the Felix Management System API as the feature is not supported by Felix yet. Once it is added to the API it will be added to the integration module.

12.3.1 Customer Account Setup

A correctly set up and working customer account will have the following details configured under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled. Synchronization with the Felix API uses the SIMPLer RADIUS to store a number of Felix specific attributes.
- ***Bucket or Subscription with bucket mapped*** – The effective bucket must be mapped to a RADIUS group that defines the Felix base attributes (i.e. has the Felix-Enabled attribute defined and preferably the QoS template for either GPON or residential gateway).
- ***ONT (Huawei)*** – added to the customer equipment (RADIUS Username will automatically be populated from the ONT's serial number)

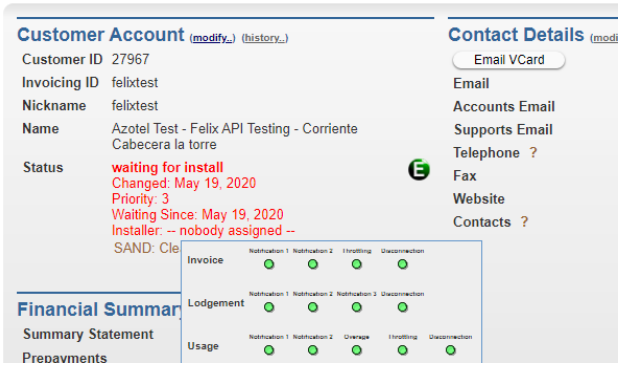
  or alternatively

- ***Serial Number of ONT*** – added as a RADIUS Username

Once the above conditions are met, the account from SIMPLer will be synchronized to the Felix CMS server. It is also suggested to use subscriptions to drive the setup of VOIP / TV/ IPTV parts of customer setup.

Below please find the steps required to set up a customer account in SIMPLer with both add an ONT (recommended) or alternatively RADIUS Username Only:

- **Step One**: Verify that the customer is assigned to, or change the customer gateway to, the 'Radius Enabled Gateway' (Fig. 12.3-1) and either make sure customer is assigned to a 'data' subscription or alternatively manually change the bucket to whatever it should be for that customer.



No Credit Card Details available

Bank Account Details (modify..) (history..)

ID Preferred

No Bank account Details available

Subscription Details (modify..) (history..) (consolidate subscriptions..)

Current Recurring Products

Code	Description	Qty	Price	Import	Disc.	Premium	TAX / VAT Rate	Total	Override	Valid Dates	Cycles Left	Traffic Allowance	Use Free Service Bonus
Felix-VoIP	Felix API VoIP Product	1	5.00	N	0.0000 %	0.0000 %	14.0000 % ?	5.70					Yes
Felix-TV	Felix API TV Product	1	10.00	N	0.0000 %	0.0000 %	14.0000 % ?	11.40					Yes
Felix-Data-600Mbps	Felix-Data-600Mbps	1	50.00	N	0.0000 %	0.0000 %	14.0000 % ?	57.00					Yes

Total Amount (EUR) 74.10
to be paid each frequency period (Including TAX / VAT)

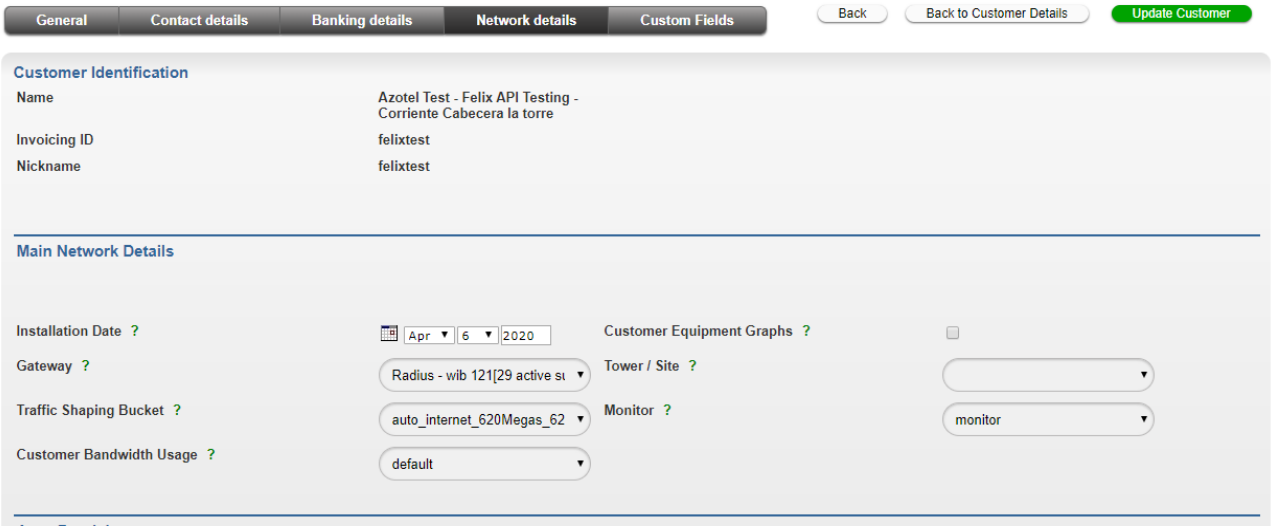


Fig. 12.3-1: Felix API – Radius Gateway / Bucket setup

- **Step Two:** Once the customer gateway and subscription/bucket changes have been submitted, a "Radius Details" subsection (Fig. 12.3.2-1) will appear under the network details on the customer page.

There are two ways an ONT serial number can be added to a customer account for provisioning:

- Adding ONT as equipment to a customer account (recommended) – this is described in chapter 12.3.2
- Adding ONT serial number as a RADIUS Username – this is described in chapter 12.3.3

12.3.2 Adding ONT to a Customer Account (recommended)

- ***Step One:*** Click 'modify' next to the Equipment Details. This takes the operator to the customer equipment management page (Fig. 12.3.2-1)

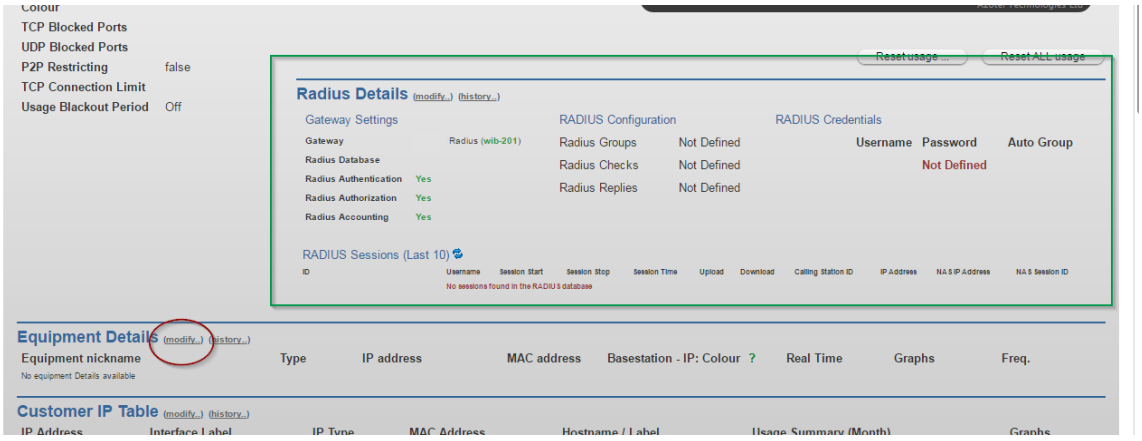


Fig. 12.3.2-1: Modify Equipment

- ***Step Two:*** Find the ONT that the respective customer is using and click 'Add'. This will add it to the equipment assigned to the customer. All equipment in "stock" will be available for selection here. (Fig. 12.3.2-2). Submit by clicking "Update CPE Table"

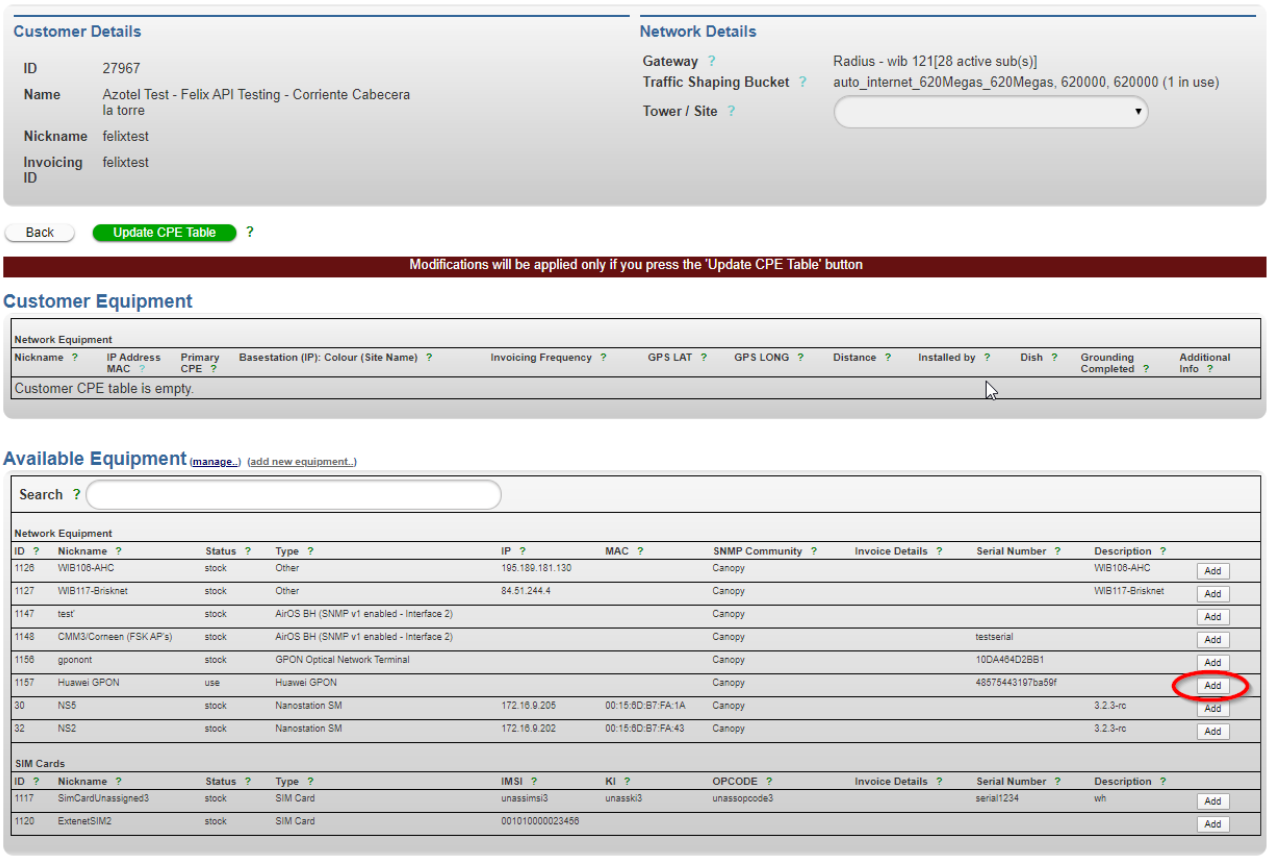


Fig. 12.3.2-2: Add Equipment

- ***Step Three:*** After the above step is completed, a RADIUS Details section will appear under the network details on the customer page. This should be set with appropriate credentials based on the GPON ONT serial number. There will also be a new entry in the 'Equipment Details' table (Fig. 12.3.2-3)

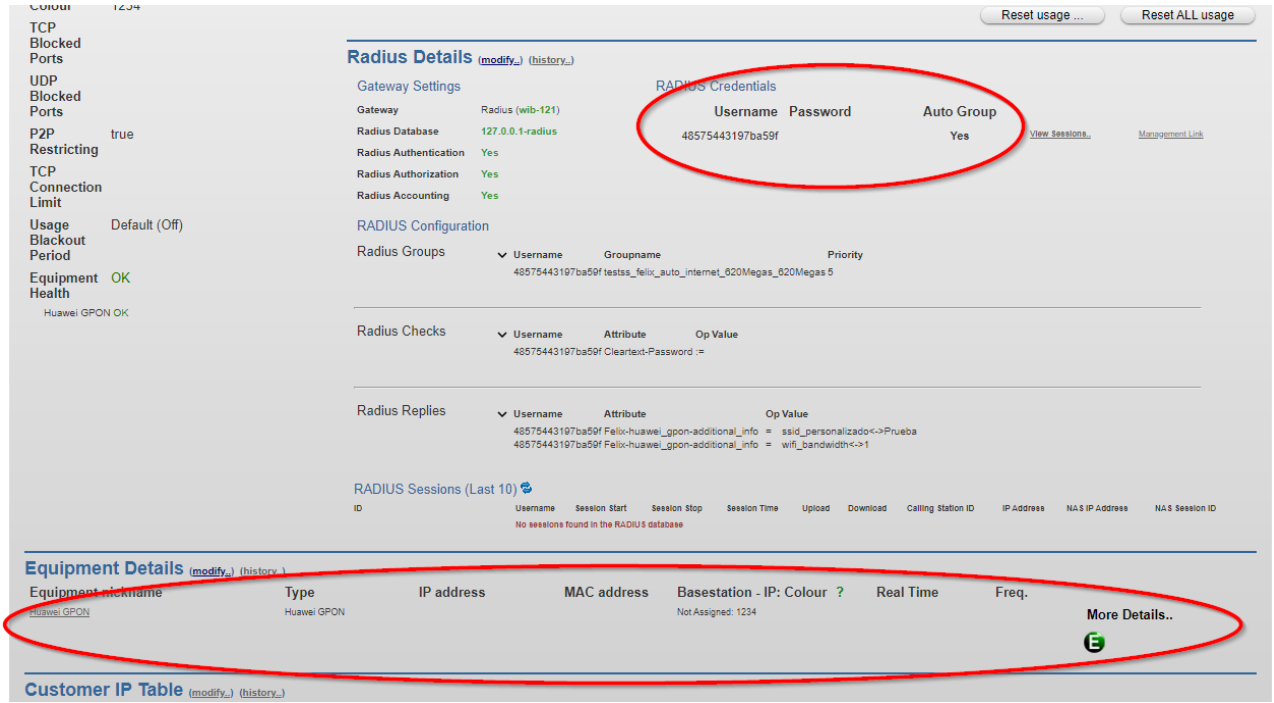


Fig. 12.3.2-3: RADIUS Credentials

- **Step Four**: Note that only ‘current’ customers will have access to the internet and their GPON ONT will be provisioned with the proper QoS as per the bucket and other services as per subscriptions. For this reason an operator should change the customer account status to ‘current’ while installation is taking place

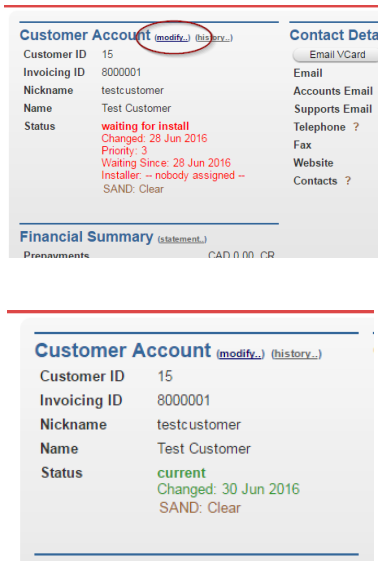


Fig. 12.3.2-7: Current Status

12.3.3 Adding ONT serial number as a RADIUS Username

Note that while what is described below is another way that an ONT serial number can be added to a customer account for provisioning we still recommend provisioning as described in chapter 12.3.2.

- ***Step One:*** Click ‘modify’ in the ‘Radius Details’ section of the relevant customer’s page

Fig. 12.3.3-1: ‘Radius Details’ section of customer page

- ***Step Two:*** Click ‘Customer Radius Usernames’

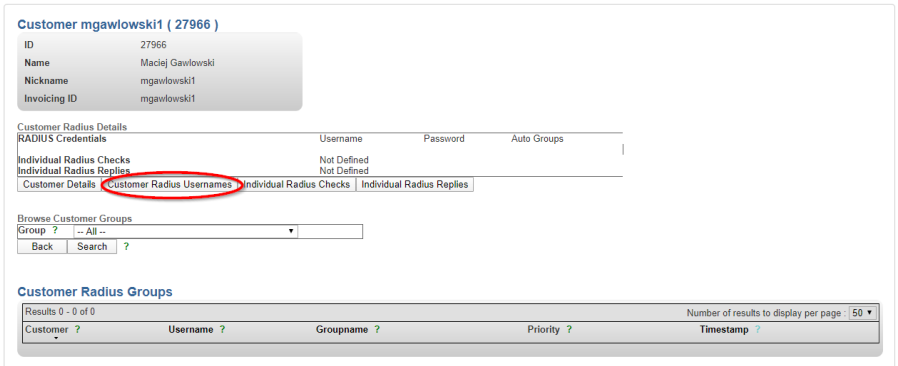


Fig. 12.3.3-2: ‘Modify Radius Details’ page section

- ***Step Three:*** Click ‘Add Blank Row’ then add the serial number of the Huawei ONT to the Username field and submit this by clicking ‘Update Table’

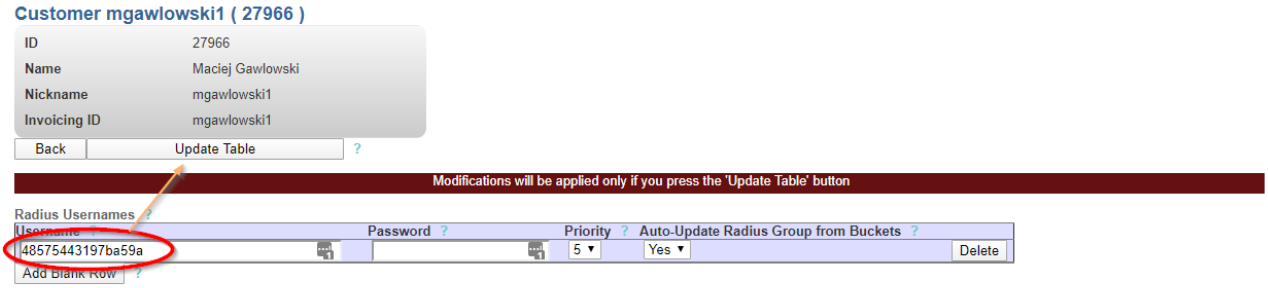


Fig. 12.3.3-3: Adding the Serial Number as a RADIUS Username

- **Step Four**: Note that only ‘current’ customers will have access to the internet and their GPON ONT will be provisioned with the proper QoS as per the bucket and other services as per subscriptions. For this reason an operator should change the customer account status to ‘current’ while installation is taking place

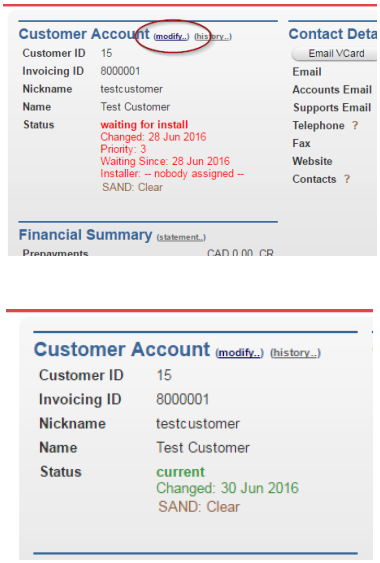


Fig. 12.3.3-4: Current Status

12.4 Buckets / Products

RADIUS groups attached to a bucket as well as subscriptions define how the GPON ONT is provisioned. This setup needs to be carried out by Azotel engineers. Please get in touch with Azotel to discuss your requirements.

12.5 RADIUS attributes

Below find a list of supported RADIUS attributes that can be used to set and fine tune all aspects of a customer account in Felix

- ***Felix-Enabled*** – enables Felix API communication – must be set for a radius username if we want to synchronize it to Felix
- ***Felix-huawei_gpon-template*** – template that is to be used for GPON ‘data’.
- ***Felix-huawei_gpon-mac_limit*** - Maximum number of macs per ONT (from 1 to 8). If omitted, by default, 1 is assigned
- ***Felix-huawei_gpon-wifi_password_active*** - Indicates if Wi-Fi password is sent
- ***Felix-huawei_gpon-wifi_password*** – Wi-Fi password

- ***Felix-huawei_gpon-mark_as_probe*** - Activate the CPE as a probe. If omitted, defaults to False
- ***Felix-huawei_gpon-additional_info*** - Additional information in “attribute<->value<->type” format. Attributes are as found in Felix. If type can be set to either of: string,null,Boolean,integer. If not provided it will default to string.
- ***Felix-voip-template*** - template that is to be used for GPON ‘voip’
- ***Felix-voip-cli*** - Phone number
- ***Felix-voip-dial_context*** - Call context
- ***Felix-voip-sip_domain*** - SIP domain (NivisNG only). It has to be within the allowed values at configuration level. Cannot update sip_domain
- ***Felix-voip-rtp_interface*** - RTP interface identifier (NivisNG only)
- ***Felix-voip-digitmap*** - DigitMap
- ***Felix-voip-dtmf*** - Values: null, "1" -> inband, "2" -> rfc2833
- ***Felix-voip-hide_calle***r - Hide call number
- ***Felix-voip-language*** - Language. Values: null, es, ca, en, fr, de (es = Spanish, ca = Catalan, en = English, fr = French, de = German (voicemail only))
- ***Felix-voip-mailbox_active*** - Activate voicemail
- ***Felix-voip-mailbox_password*** - Mailbox password
- ***Felix-voip-nat*** - Values: 1 -> Yes, 2 -> No
- ***Felix-voip-no_proxy*** - Values: 1 -> Yes, 2 -> No
- ***Felix-voip-pbx_extension*** - Activate PBX extension
- ***Felix-voip-pbx_id*** - PBX identifier
- **Felix-voip-pbx_component_type -** Where is the PBX going to register. If the field does not come it assumes the configuration of Felix or the contract. If the field does not come and there is eXtension, it will be the default value when creating a new PBX. This value cannot change from "extension" to "xema". Values:
    - "xema" -> PBX in Xema / Nivis
    - "extension" -> PBX in eXtension
- ***Felix-voip-sip_username*** - SIP username manual
- ***Felix-voip-sip_password*** - SIP password manual
- ***Felix-voip-additional_info*** -Additional Information in “attribute<->value<->type” format. Attributes are as found in Felix. If type can be set to either of: string,null,Boolean,integer. If not provided it will default to string.
- ***Felix-tv-template*** - template that is to be used for GPON ‘tv’
- ***Felix-tv-additional_info*** -Additional Information in “attribute<->value<->type” format. Attributes are as found in Felix. If type can be set to either of: string,null,Boolean,integer. If not provided it will default to string.
- ***Felix-iptv-template*** - template that is to be used for GPON ‘residential_gateway’
- ***Felix-iptv-bouquets*** - IPTV Bouquets
- ***Felix-iptv-additional_info -***Additional Information in “attribute<->value<->type” format. Attributes are as found in Felix. If type can be set to either of: string,null,Boolean,integer. If not provided it will default to string.
- ***Felix-residential_gateway-template*** - template that is to be used for GPON ‘residential_gateway’
- ***Felix-residential_gateway-wifi_password_active*** - Indicates if Wi-Fi password is sent
- ***Felix-residential_gateway-wifi_password*** - Wifi password
- ***Felix-residential_gateway-pppoe_active*** - Indicates if pppoe credentials are sent (username and password)
- ***Felix-residential_gateway-pppoe_username*** - Pppoe user
- ***Felix-residential_gateway-pppoe_password*** - Pppoe password
- ***Felix-residential_gateway-additional_info*** -Additional Information in “attribute<->value<->type” format. Attributes are as found in Felix. If type can be set to either of: string,null,Boolean,integer. If not provided it will default to string.
- ***Felix-iptv_residential_gateway-template*** - template that is to be used for GPON ‘iptv’
- ***Felix-iptv_residential_gateway-additional_info*** -Additional Information in “attribute<->value<->type” format. Attributes are as found in Felix. If type can be set to either of: string,null,Boolean,integer. If not provided it will default to string.
- ***Felix-huawei_gpon-template_flag*** – template flag allows to cycle through template version
- ***Felix-voip-template_flag*** – template flag allows to cycle through template version
- ***Felix-tv-template_flag*** – template flag allows to cycle through template version
- ***Felix-iptv-template_flag***– template flag allows to cycle through template version
- ***Felix-residential_gateway-template_flag*** – template flag allows to cycle through template version
- ***Felix-iptv_residential_gateway-template_flag*** – template flag allows to cycle through template version

13 Alianza API Integration

13.1 Introduction

The integration module that was developed for Alianza API allows an operator to:

- streamline customer accounts setup in Alianza
- check the base status of an Alianza account directly from the customer details page in SIMPLer
- synchronize SIP accounts from Alianza to SIMPLer with a hit of a button
- update a customer status in Alianza automatically to match the customer status in SIMPLer

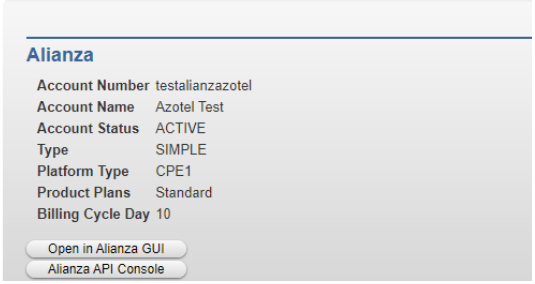
13.2 Status Section on Customer Details page

When enabled the integration module will communicate with Alianza API each time the customer details page is opened and will display the detailed status about the account as reported by Alianza API. The report covers the base settings of the Alianza account such as:

- ***Account Number:*** must be the same / match a field in SIMPLer (nickname by default) to link Alianza and SIMPLer
- ***Account Name:*** When pushed from SIMPLer it will default to customer name field. Can be changed in Alianza afterwards. It does not have to match any fields in SIMPLer
- ***Account Status:*** ACTIVE or DISABLED - account status will be automatically updated from SIMPLer every time customer status changes. Account status will be set as ACTIVE if customer is 'current' in SIMPLer otherwise it will be set to DISABLED
- ***Type:*** SIMPLE or ADVANCED
- ***Platform Type:*** as set in Alianza
- ***Product Plans:*** this field will list all product plans assigned to the Alianza account
- ***Billing Cycle Day:*** this field is defined upon customer account setup and will match the operator billing day. Can be overridden afterwards from Alianza GUI
- ***Calling Plans:*** once calling plans are added to customer account using Alianza GUI - these will also be displayed
  - *Start Date*
  - *Plan Minutes*
  - *Seconds Remaining*
- ***SIP Lines:*** once set in Alianza GUI these will also be listed on customer details API status section. The following details will be displayed for each line:
  - *lineNumber*
  - *sipUsername*
  - *sipPassword*
  - *displayName*
  - *emergencyNumber*
  - *macAddress*

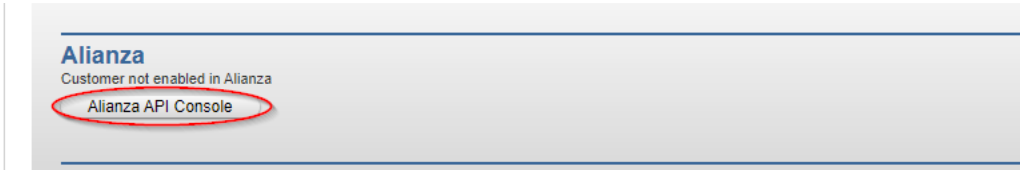
Additionally there will be two buttons displayed in the Alianza status section of customer details page:

- **Open in Alianza GUI** - opens an Alianza GUI Admin page in a separate window
- **Alianza API Console** - opens an interactive console window that allows to execute some basic commands

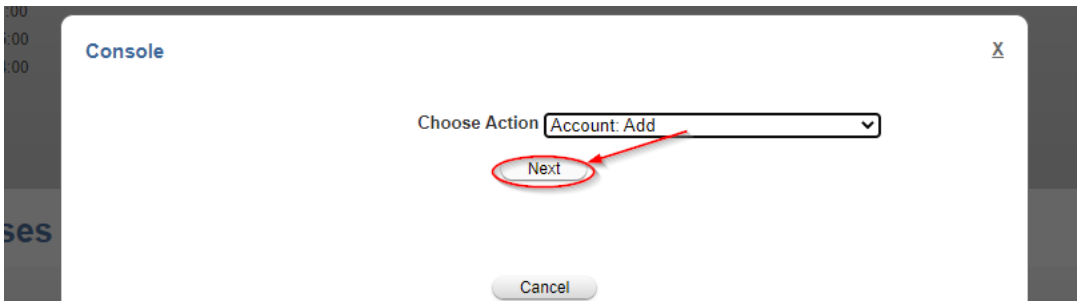


13.3 Adding customer to Alianza

For customers that do not have an account created in Alianza yet a "Customer not enabled in Alianza" message will be displayed. Operator should use the API Console to start the customer setup in Alianza.

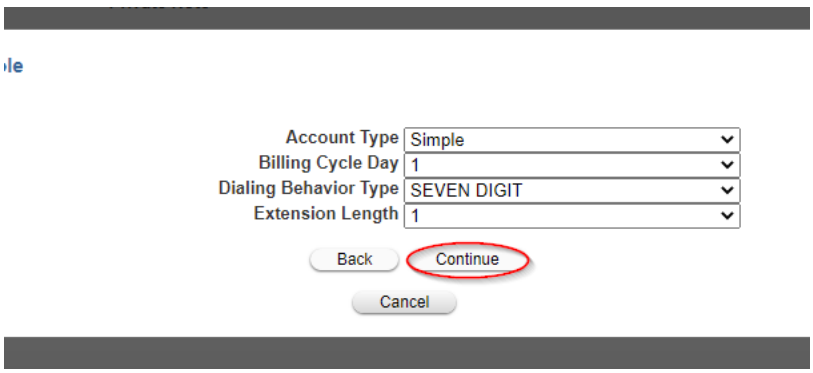


In the API Console choose action: "***Account: Add"***, then click ***"Next"***

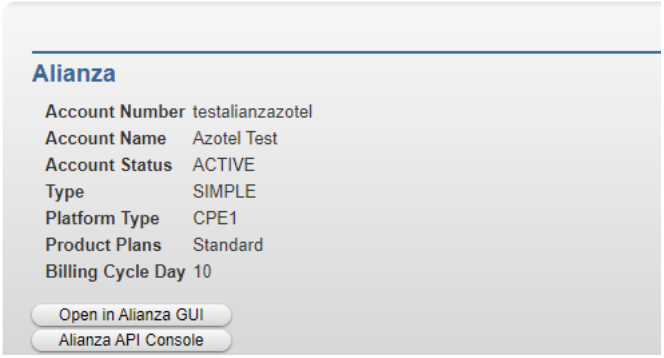


On the next page define following attributes of the account that is being created:

- ***Account Type***:
  - *SIMPLE* - these accounts only allow one telephone number, one user, and one device. It is not necessary to specify extension length or specify an extension number for the user.
  - *ADVANCED* - these accounts allow multiple phone numbers, multiple users, and multiple devices. Advanced accounts allow the end user to use extension-to-extension dialling, therefore it is necessary to define a length of extensions to be used. Also in the dialling behaviour, ADVANCED accounts now allow dialling 9 plus 10 or 11 digit dialling. If no extension-to-extension dialling is needed, the dialling behaviour can be set to 7, 10, or open dialling.
- ***Billing Cycle Day*** - defines day that is used for all billing calculations i.e. minute package usage etc
- ***Dialling Behaviour Type***:
  - *SEVEN DIGIT*
  - *TEN DIGIT*
  - *OPEN DIAL PLAN*
  - *DIAL NINE SEVEN DIGIT*
  - *DIAL_NINE_TEN_DIGIT*
- ***Extension Length*** - this field has to be defined only for Type ADVANCED accounts that have multiple lines set and the extension-to-extension dialling is required.



Once ***"Continue"*** button is pressed the account will be created and the browser redirected back to the customer details page in SIMPLer



Next step is to click on the ***"Open in Alianza GUI"*** button and complete the account setup from Alianza Admin pages. In the process Address, SIP Lines, Call packages will be assigned to the Voice account.

Please refer to Alianza manuals / training for details on how to complete the process.

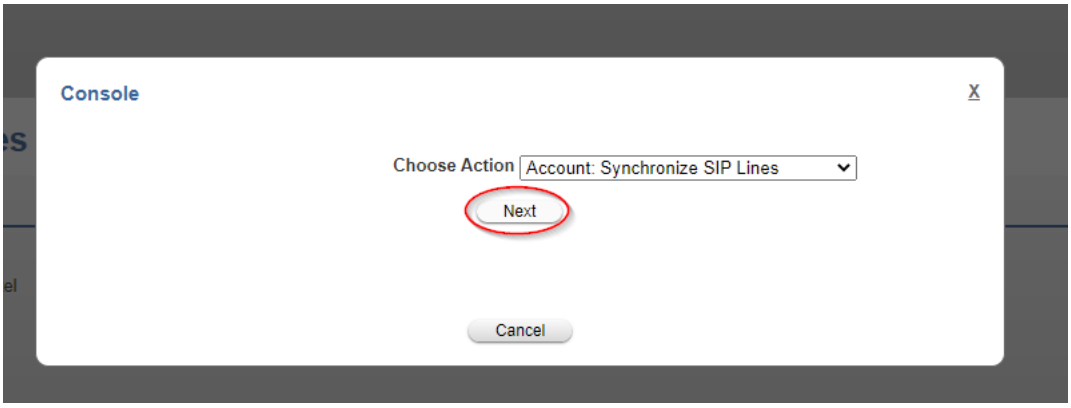
Once the customer account is set in Alianza please go back to SIMPLer.

Open the API console and execute "Account: Synchronize SIP Lines" to poll the SIP lines that were configured.

Then add them to Alianza voice details table in SIMPLer that lists all SIP accounts and configures them to customer equipment where such feature is supported (i.e. Zhone)

13.4 Synchronizing SIP Lines

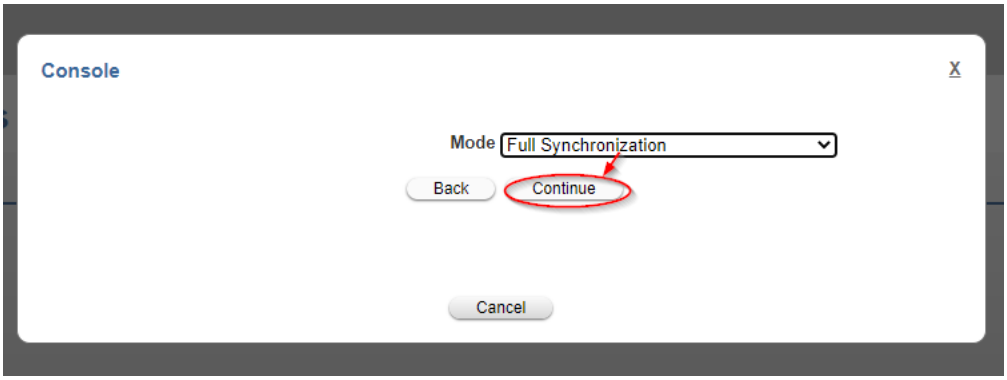
Synchronize SIP Lines procedure has to be carried out if the SIP lines were added/modified in Alianza. Upon execution SIMPLer will scan for any SIP account changes and apply same in SIMPLer database and customer equipment (where supported). To start the procedure open the ***"API Console"*** and select ***"Account: Synchronize SIP Lines"*** option then click on ***"Next"*** button



Then select the synchronization ***"Mode"*** and click on ***"Continue"***. There are two modes supported:

- ***Full Synchronization*** - when this option is selected Alianza SIP accounts in SIMPLer will match exactly what is in Alianza. New accounts will be added to SIMPLer, modifications will be applied to existing accounts and any additional accounts in SIMPLer that do not exist in Alianza will get deleted from SIMPLer
- ***Add only*** - when this mode is selected - new accounts and modifications to existing ones will be synchronized to SIMPLer. Accounts that exist in SIMPLer, but not in Alianza will not get deleted.

Once this process is completed SIP accounts will be synchronized and the browser will be directed back to the customer details page.

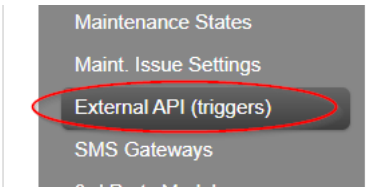


13.5 Deleting customer from Alianza

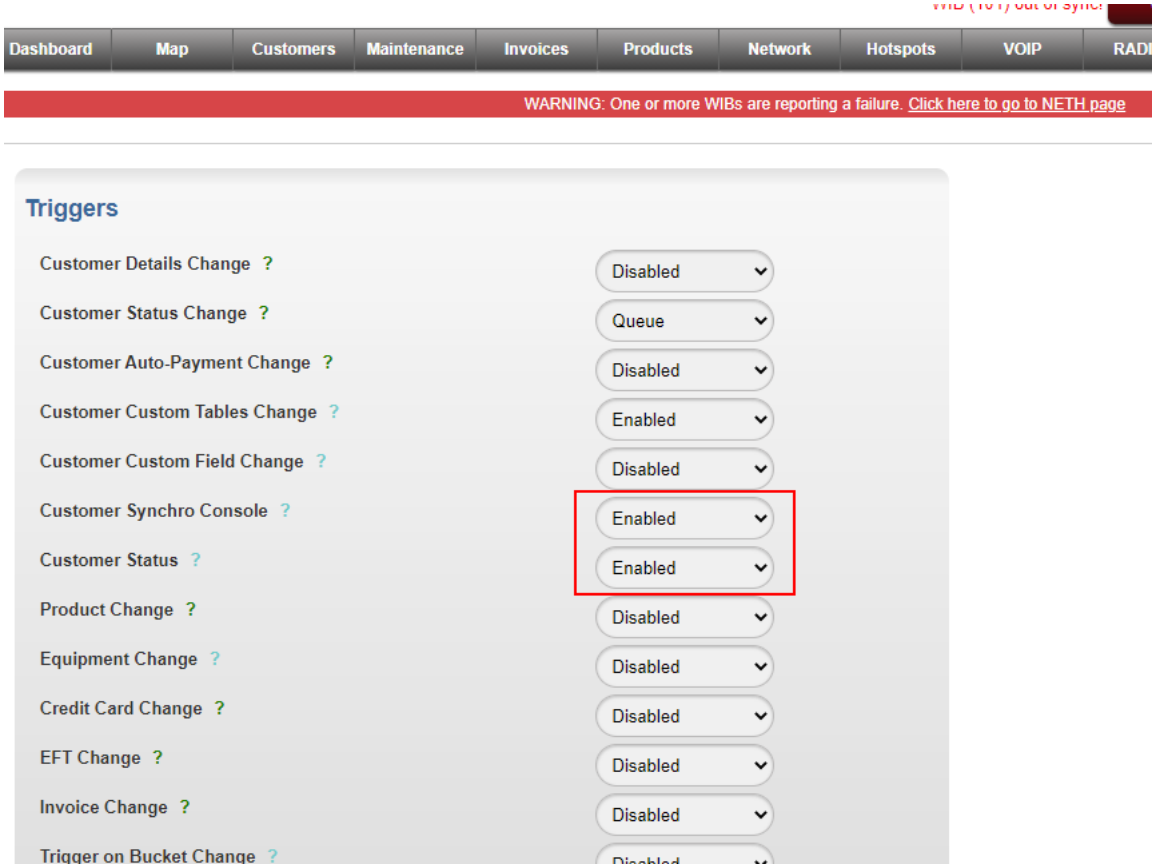
To delete a customer from Alianza open ***"API Console"***, select ***"Account: Delete"*** option and press ***"Next"***.

13.6 Integration setup

The API integration can be set from the ***"Settings -> External API (triggers)"*** page in SIMPLer. While it is always better to leave the setup to Azotel engineering staff - here are some setup tips:



To enable the status section on customer details page and the console commands please select the ***"Customer Synchro Console"*** and ***"Customer Status"*** to enabled

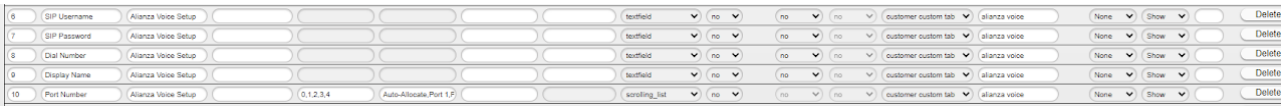


Then add the trigger definition for Alianza API. The important bits to get right are:

- ***API_USERNAME*** - username as used in the Alianza GUI Admin
- ***API_PASSWORD*** - password as used in the Alianza GUI Admin
- ***Account_Number_Field*** - defines the field that will be used to link SIMPLer with Alianza. Defaults to SIMPLer's customer 'nickname' if left blank (recommended)
- ***Custom_SIP_Table_dialNumber*** - ID of the custom 'Alianza Voice' table ***"Dial Number"*** field (for synchronizing SIP accounts)
- ***Custom_SIP_Table_displayName*** - ID of the custom 'Alianza Voice' table ***"Display Name"*** field (for synchronizing SIP accounts)
- ***Custom_SIP_Table_password*** - ID of the custom 'Alianza Voice' table ***"SIP Password"*** field (for synchronizing SIP accounts)
- ***Custom_SIP_Table_portNumber*** - ID of the custom 'Alianza Voice' table ***"Port Number"*** field (for synchronizing SIP accounts)
- ***Custom_SIP_Table_userName*** - ID of the custom 'Alianza Voice' table ***"User Name"*** field (for synchronizing SIP accounts)

Once all above fields are filled out - click on ***"Update Trigger Settings"*** to confirm

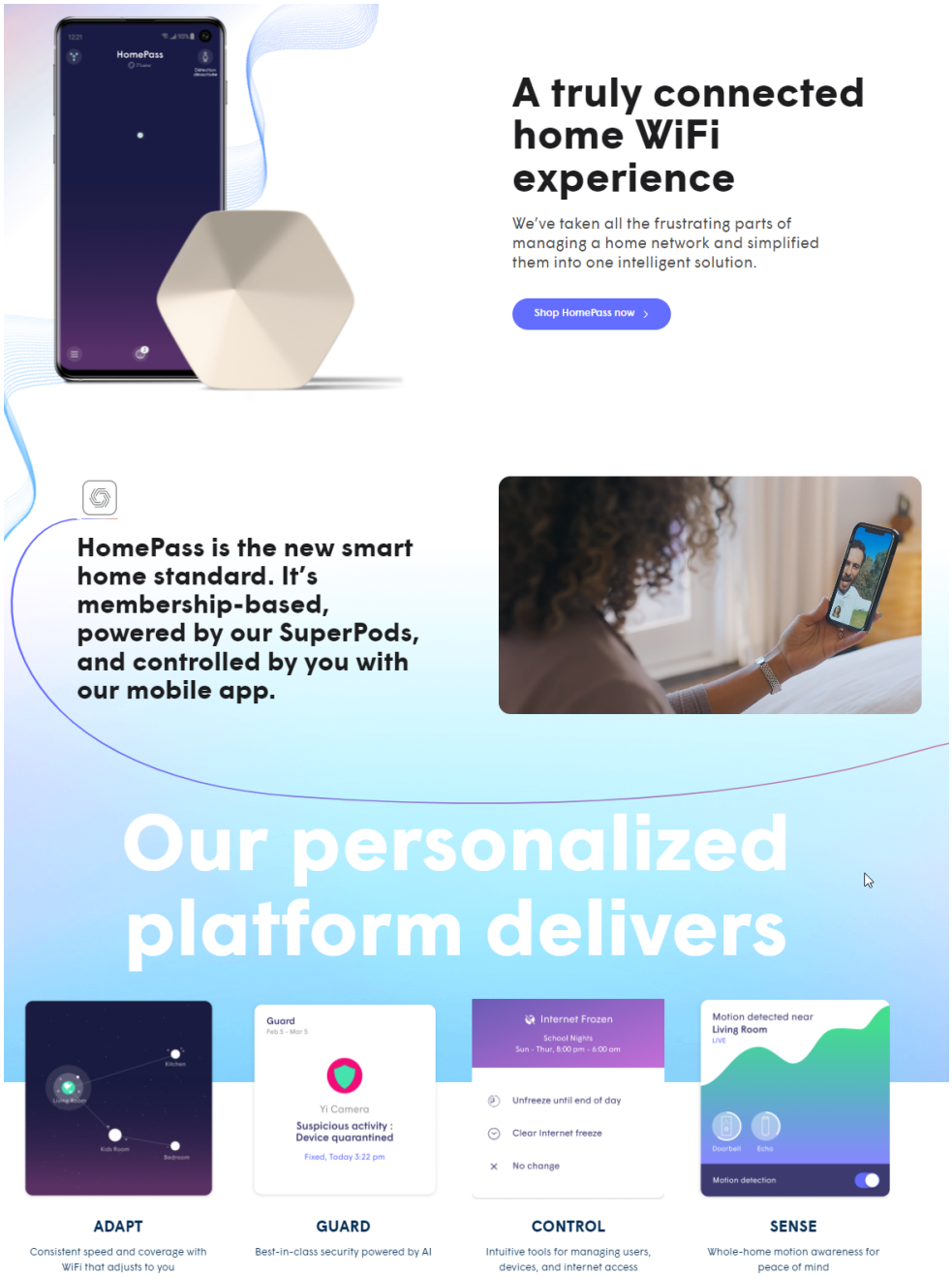
As mentioned above "***Custom_SIP_Table_dialNumber, Custom_SIP_Table_displayName, Custom_SIP_Table_password, Custom_SIP_Table_portNumber, Custom_SIP_Table_userName"*** fields should match the Alianza Voice custom table that lists SIP accounts. See below



14 Plume Integration

14.1 Introduction

This section will supply a general outline of the integration available between SIMPLer and Plume (plume.com) for "worry-free WiFi" Home / Small Business solutions.



https://www.plume.com/homepass/

https://www.plume.com/workpass/

https://www.plume.com/

SIMPLer integration with Plume API allows driving a customer account setup in Plume completely from SIMPLer platform in as streamlined way as possible ensuring that an installer can complete the whole process seamlessly from SIMPLer Mobile APP.

Once set – SIMPLer will synchronize the customer account status with SIMPLer as well as manage its subscription based configuration upon some additional Plume related products being upsold.

14.2 Plume API trigger setup

Please note that while this chapter describes Plume trigger setup options, Azotel strongly advises against operators setting the module up themselves. It is probably best to leave the process up to Azotel engineering team.

Note: Please refer to chapter 2.3 for the External API Trigger configuration page description.

Mandatory Settings:

Before setting up Plume API trigger, the below API access details must be obtained:

- ***API_URL*** – Plume API URL– defaults to: *https://piranha-gamma.prod.us-west-2.aws.plumenet.io*
- ***Auth_URL*** – Authentication Okta API URL- defaults to: https://external.sso.plume.com/oauth2/{{**unique Plume CloudID**}}/v1/token
- ***Auth_headerToken*** – bearer token as provided by Plume
- ***Auth_partnerId*** – unique Plume Partner ID as provided by Plume
- ***Auth_role*** – authentication role to be used in Octa. Defaults to: partnerIdAdmin
- ***Plume_Admin_GUI*** – URL of the main admin Plume portal that is used by the operator. Unless advised otherwise it should use the default i.e.: https://admin.plume.com
- ***Portal_Tier1*** – URL of the Tier 1 Frontline portal – for crosslinking from SIMPLer. Unless advised otherwise it should use the default i.e.: https://gamma.central.plume.com/
- ***Portal_Tier23*** – URL of the Tier 2&3 Frontline portal – for crosslinking from SIMPLer. Unless advised otherwise it should use the default i.e.: https://gamma.noc.plume.com/

Optional Settings:

Below listed is a set of additional global attributes that can be defined for the API module:

- ***Default_Enable_Integration*** – this flag enables / disables the integration
- ***Ignore_SSL_Errors*** – option that allows proceeding with API communication in cases where SSL errors arise due to whatever reason (i.e. SSL certificate on Plume API expires etc.)
- ***Equipment_Types_For_Nodes*** – comma separated list of equipment types that should be treated as gateways. Defaults to 'plumenode'
- ***Equipment_Types_For_Gateways*** - comma separated list of equipment types that should be treated as gateways. Defaults to 'plumegateway'
- ***Exclude_Customer_Statuses*** – defines a list of customer statuses that should be excluded from the adding customers to Plume. This way operator can avoid adding to Plume accounts that are in too early stages when it is still not determined whether they will become a regular customer. Defaults to: Web Request,contract,potential
- ***Default_AccountId*** - defines customer field that is to be used as an AccountId in Plume. Defaults to nickname,
- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent to any location.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization*** **–** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Plume server. This is option is not recommended to use unless there are multiple communication issues between SIMPLer and Plume API.

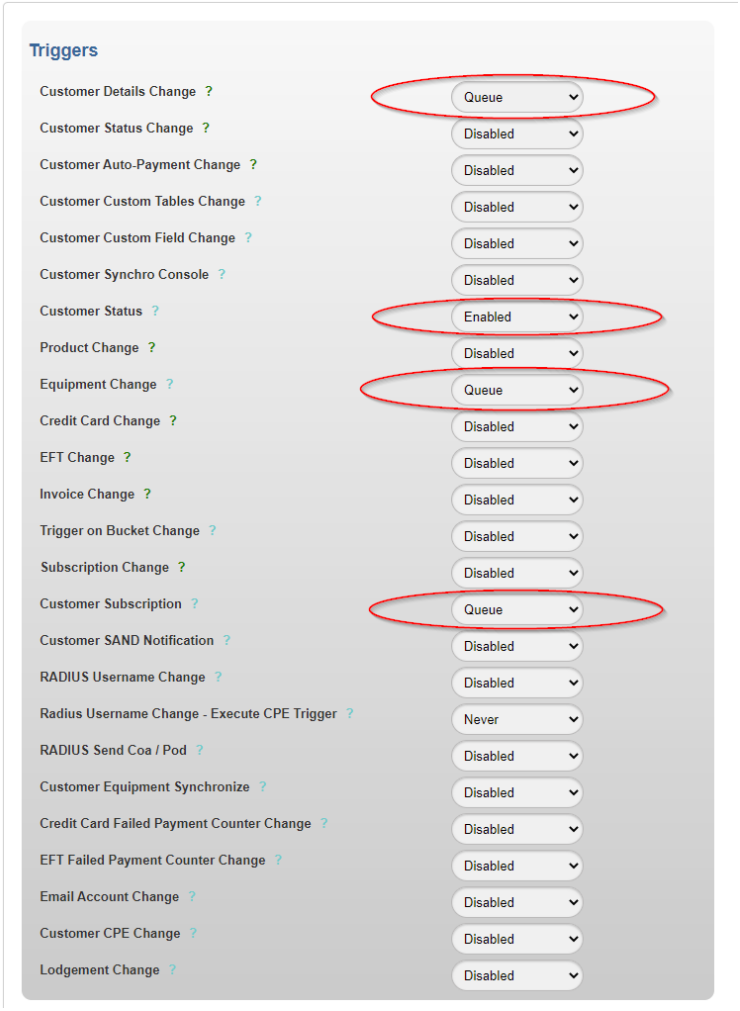
Below listed is a set of additional customer setup related attributes that can be defined at global / subscription / customer levels:

- ***Default_completeOnboarding*** – [enabled/disabled] defines if the onboarding should be marked as completed under Plume account
- ***Default_disableWiFi*** – [enabled/disabled] if enabled this flag allows to disable WiFi completely under customer site
- ***Default_numPodsAuthorized*** – defines number of Plume pods authorized at customer location. Customer will not be able to hook up any more Nodes than what is defined under this attribute
- ***Default_Profile*** – [auto/smallbusiness] - defines profile (HomePass or WorkPass) used for customer account in Plume. By default it is set to 'auto' which is equal to HomePass. Setting it to 'officepass' switches customer to WorkOffice account.
- ***Default_Password*** – defines a password (if any) that is to be set under customer account. By default this field is left blank which means that Plume will auto-generate a random password – that in reality customer should change upon signing up to the portal (with Password reset procedure)
- ***Default_Email*** – defines how to construct the email the pushed to Plume. Defaults to %%email%% which means that customer email address will be pushed
- ***Default_Password_Reset*** – [enabled/disabled] if enabled an email with password reset procedure will be send to the customer email address upon adding to Plume
- ***Default_Resend_Email_Verification*** – [enabled/disabled] if enabled an verification email will be send to the customer email address upon adding to Plume
- ***Default_Set_Email_As_Verified*** – [enabled/disabled] if enabled the email pushed from SIMPLer will be marked as Verified in Plume with no further verification required. This 'enables' the customer to login to the self-service Plume portal (HomePass, OfficePass).
- ***Default_SSID*** – defines the WiFi SSID. Defaults to Plume%%GATEWAYSERIALLAST2%%
- ***Default_SSID_Mode*** – [always,updateOnlyOnChange] if set to 'always' SIMPLer will update the SSID if it was changed by the customer while if set to 'updateOnlyOnChange' SIMPLer will only update the SSID once (at the initial setup) allowing the customer to control and change their WiFi's SSID though the Plume App
- ***Default_EncryptionKey*** – defines the WiFi encryption key. Default to %%GATEWAYSERIAL%%. As there is no way to actively check what is set under the EncryptionKey via Plume API - Encryption key will be pushed only when SIMPLer updates SSID in Plume
- ***Default_serviceLevelCurrentCustomer*** – [noService/basicService/fullService] defines the service level of Plume account for customers that are 'current' in SIMPLer. Defaults to fullService
- ***Default_serviceLevelNonCurrentCustomer*** - [noService/basicService/fullService] defines the service level of Plume account for customers that are 'not current' in SIMPLer. Defaults to basicService
- ***Default_NicknameCalculation*** – [description_nickname/nickname] defines how the Node label in Plume should be generated. If set to 'nickname' – equipment nickname will be used as the label in Plume. If set to 'description_nickname' – equipment description than nickname if description in blank will be used as label in Plume
- ***Product_Field_completeOnboarding*** – [default/enabled/disabled] overrides 'Default_completeOnboarding' at customer subscriptions level
- ***Product_Field_disableWiFi*** – [default/enabled/disabled] overrides 'Default_disableWiFi' at customer subscriptions level
- ***Product_Field_numPodsAuthorized*** - overrides 'Default_numPodsAuthorized' at customer subscriptions level
- ***Product_Field_Profile*** - [default/auto/smallbusiness]overrides 'Default_Profile' at customer subscriptions level
- ***Product_Field_Password*** - [default/enabled/disabled] overrides 'Default_Password' at customer subscriptions level
- ***Product_Field_Email*** - overrides 'Default_Email' at customer subscriptions level
- ***Product_Field_Password_Reset*** - [default/enabled/disabled]overrides 'Default_Password_Reset' at customer subscriptions level
- ***Product_Field_Resend_Email_Verification*** - [default/enabled/disabled] overrides 'Default_Resend_Email_Verification' at customer subscriptions level
- ***Product_Field_Set_Email_As_Verified*** - [default/enabled/disabled] overrides 'Default_Set_Email_As_Verified' at customer subscriptions level
- ***Product_Field_SSID*** - overrides 'Default_SSID' at customer subscriptions level
- ***Product_Field_SSID_Mode*** – [default,always,updateOnlyOnChange] overrides 'Default_SSID_Mode' at customer subscriptions level
- ***Product_Field_EncryptionKey*** - overrides 'Default_EncryptionKey' at customer subscriptions level
- ***Product_Field_serviceLevelCurrentCustomer*** - [default/noService/basicService/fullService] overrides 'Default_serviceLevelCurrentCustomer' at customer subscriptions level
- ***Product_Field_serviceLevelNonCurrentCustomer*** - [default/noService/basicService/fullService] overrides 'Default_serviceLevelNonCurrentCustomer' at customer subscriptions level
- ***Product_Field_NicknameCalculation*** - [default/description_nickname/nickname] overrides 'Default_ NicknameCalculation' at customer subscriptions level
- ***Customer_Field_completeOnboarding*** - overrides 'Default_NicknameCalculation' at customer account level
- ***Customer_Field_disableWiFi*** - [default/enabled/disabled] overrides 'Default_disableWiFi' at customer account level
- ***Customer_Field_numPodsAuthorized*** - overrides 'Default_numPodsAuthorized' at customer account level
- ***Customer_Field_Profile*** - [default/auto/smallbusiness]overrides 'Default_Profile' at customer account level
- ***Customer_Field_Password*** - [default/enabled/disabled] overrides 'Default_Password' at customer account level
- ***Customer_Field_Email*** - overrides 'Default_Email' at customer account level
- ***Customer_Field_Password_Reset*** - [default/enabled/disabled]overrides 'Default_Password_Reset' at customer account level
- ***Customer_Field_Resend_Email_Verification*** - [default/enabled/disabled] overrides 'Default_Resend_Email_Verification' at customer account level
- ***Customer_Field_Set_Email_As_Verified*** - [default/enabled/disabled] overrides 'Default_Set_Email_As_Verified' at customer account level
- ***Customer_Field_SSID*** - overrides 'Default_SSID' at customer account level
- ***Customer_Field_SSID_Mode*** - [default,always,updateOnlyOnChange] overrides 'Default_SSID_Mode' at customer account level
- **Customer_Field_EncryptionKey** - overrides 'Default_EncryptionKey' at customer account level
- ***Customer_Field_serviceLevelCurrentCustomer*** - [default/noService/basicService/fullService] overrides 'Default_serviceLevelCurrentCustomer' at customer account level
- ***Customer_Field_serviceLevelNonCurrentCustomer*** - [default/noService/basicService/fullService] overrides 'Default_serviceLevelNonCurrentCustomer' at customer account level
- ***Customer_Field_NicknameCalculation*** - [default/description_nickname/nickname] overrides 'Default_NicknameCalculation' at customer account level

14.2.1 Example Plume API configuration entry

The Plume integration requires triggers shown on the screenshot at Fig. 14.2.2 to be enabled as a part of the configuration process:

- ***Customer Details Change*** – enabling this trigger is required for the integration to work
- ***Equipment Change*** – enabling this trigger is required for the integration to work
- ***Customer Subscription*** – this trigger is optional and should be enabled if parts of Plume customer setup is simpler product (subscription) driven
- ***Customer Status*** – enabling this trigger will display the live section on customer details page that polls & displays live data plus links to Frontline Tier1 and Tier2&3



14.2.2 Example Plume API configuration entry

Note: Plume API module does not support collecting usage figures

14.3.1 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Equipment*** – Plume equipment installed at customer location must be added to the customer account in SIMPLer in order to get it all set properly, having the customer account with its respective Nodes pushed down to Plume
- ***Subscription*** – (optional) in cases where some parts of Plume account setup are driven from Subscription – it might be required to add a subscription to a customer account in order to activate a particular feature (i.e. WorkPass)

- ***Customer Status*** – (optional) note that the integration might be set to only start pushing customer account to Plume API for certain customer statuses – in such case it is important to remember that the account in Plume will not be created until customer account is on one of the "enabled" customer state is met

Below please find the steps required to set up a Plume enabled customer account in SIMPLer with both the SIMPLer GUI or alternatively via Mobile App.

14.3.2 Adding Plume Equipment via SIMPLer GUI

Pease note that Azotel strongly recommends using Mobile App for installers as it is by far the best and most convenient choice while working on the customer site. It has a build in bar and QR code scanners that will greatly improve the experience of adding Plume equipment to customer account providing the most streamlined process possible. Adding Plume Equipment via Mobile App is described in Chapter 14.3.3 of this manual.

That being said Plume gear can also be added to the customer account from SIMPLer GUI as described in the below steps:

- ***Step One:*** Click on the 'modify' link next to the Equipment Details. This takes the operator to the customer equipment management page. (See Fig. 14.3.2-1)

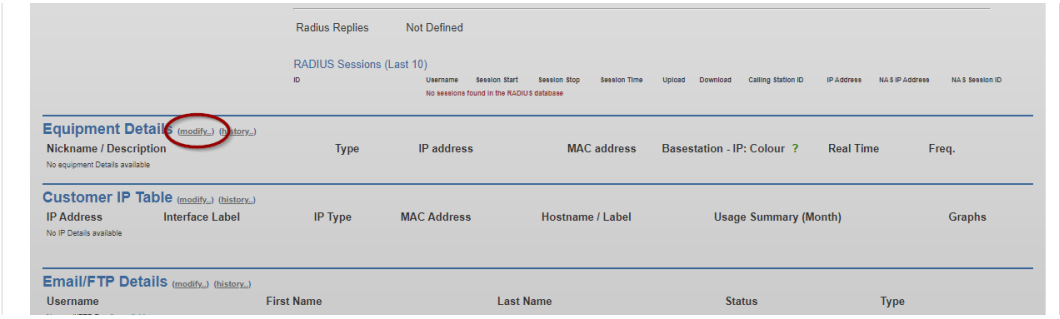


Fig. 14.3.2-1: Modify Equipment

- ***Step Two:*** Find under the ***'Available Equipment'*** section each of the Plume Nodes that the respective customer is using and click on the ***'Add'*** button next to them to move them to the ***'Customer Equipment'*** section. All equipment in ***"stock"*** will be available for selection here. (See Fig. 14.3.2-2). Submit by clicking ***"Update CPE Table"*** button once completed adding all Plume nodes.

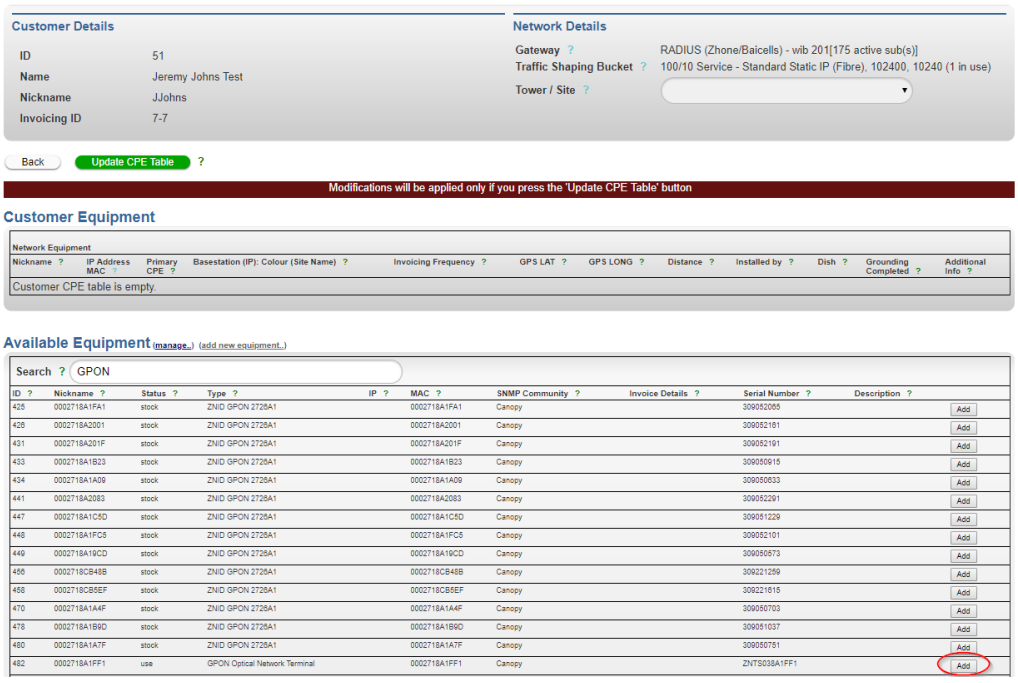


Fig. 14.3.2-2: Add Equipment

- ***Step Three:*** Customer details page will be displayed after the new equipment was submitted. All Plume Nodes will show up under ***'Network -> Equipment Details'*** section. Next step is to upgrade one of customer Nodes (one that is connected to internet feed) type to 'Plume Gateway'. Click on the green ***'E'*** button in the respective equipment row and change its type from ***'Plume Node'*** to ***'Plume Gateway'***. This step concludes the setup.

  Note: It might also be good to review and update Plume Nodes descriptions as these will be pushed to Plume as Node labels. Having them reflect an actual location in the customers Home/Office with floor markings might greatly improve post installation support processes

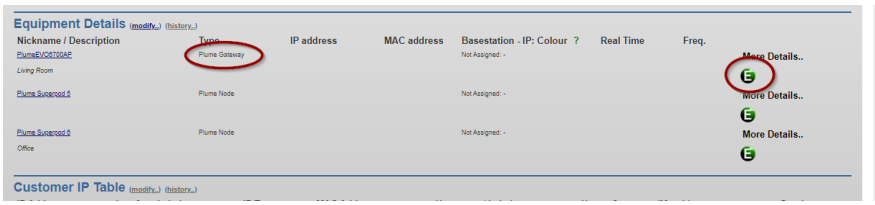


Fig. 14.3.2-3: Editing customer equipment type

- ***Step Four:*** Once the changes are propagated to Plume there will also be an additional ***'External Integration Status'*** section displayed on the customer details page where Plume related section will appear. This dedicated Plume section carries some basic information about the customer account in Plume as well as it provides two buttons that take directly to customer page in ***'Plume Frontline Tier 1'*** and ***'Plume Frontline Tier 2&3'***.

  Note: any changes made in SIMPLer or Mobile App will be pushed to Plume API within 3 minutes from the change being submitted. Hence please reload the customer details page after 3 minutes if the Plume section is not available under customer details yet.

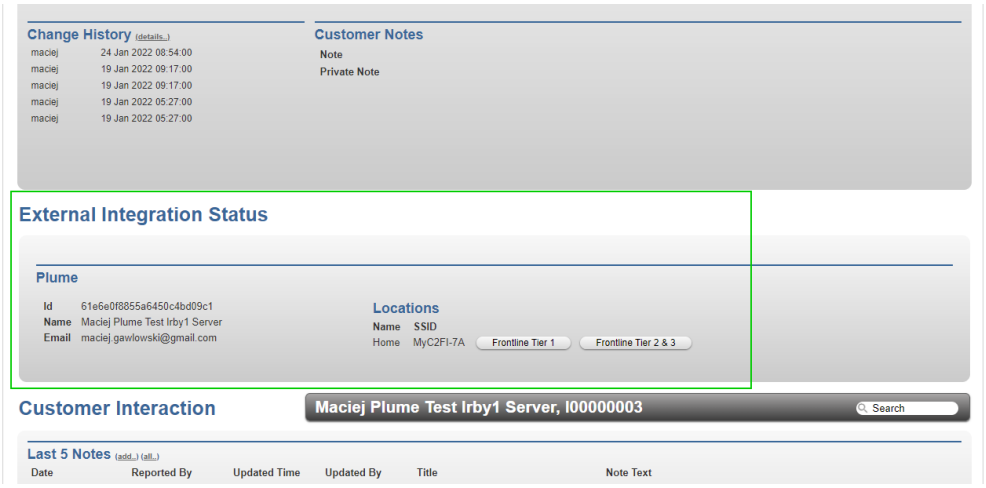


Fig. 14.3.2-4: 'External Integration Status' section

- **Step Five**: (optional) in cases where some Plume features are driven from products (subscriptions) verify that appropriate subscriptions were added to the customer account
- **Step Six**: (optional) Note to update the customer status to one of allowed in cases were only certain customer statuses are enabled for "new account provisioning"

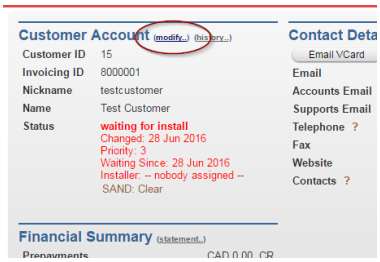


Fig. 14.3.2-5: Current Status

14.3.3 Adding Plume Equipment via Mobile App

Mobile App is by far the best and most convenient choice for an installer to work with while on customers site. As it has a build in bar and QR code scanners it will greatly improve the experience of adding Plume equipment to customer account providing the most streamlined process possible. Follow below steps to add Plume equipment via Mobile App.

Step One: Navigate to customer details page in the Mobile App. To do so first type any of unique customer details such as ***name, nickname, invoicingid or address*** into the search box and next click on the ***'Search'*** button. Review the list of customers matching the search and click on the record representing customer that was sought for to open the customer details page.

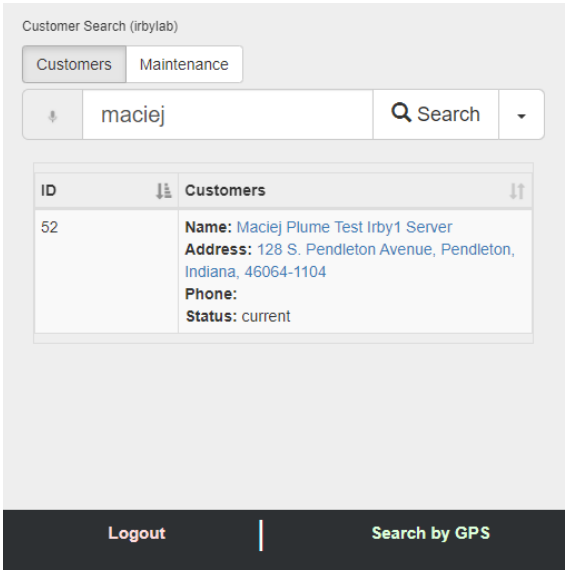


Fig. 14.3.3-1: Search Customer

- ***Step Two:*** Navigate to the ***'Network'*** section of the page and Click on the ***'+'*** button next to the ***'Equipment Details'*** label. (See Fig. 14.3.2-2) This will open the ***'Import Equipment to Customer'*** page.

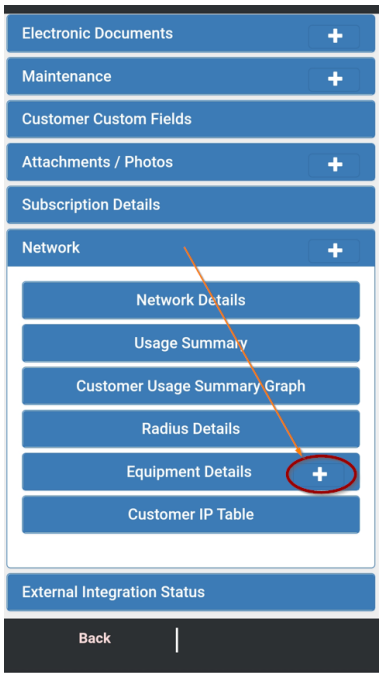


Fig. 14.3.3-2: Network / Equipment Details section

- ***Step Three:*** Either type in all serial numbers of the equipment added to the ***"MAC Address / Serial Number List"*** window or preferably click on the ***'bar code icon'*** to enable bar code / QR code scanner than use it to scan all serial numbers directly from Plume equipment. Note that multiple nodes can be scanned / added at once, hence it is possible to complete the process of adding multiple equipment pieces in one step. Finally click on ***'Search'*** button once completed adding / scanning serial numbers.

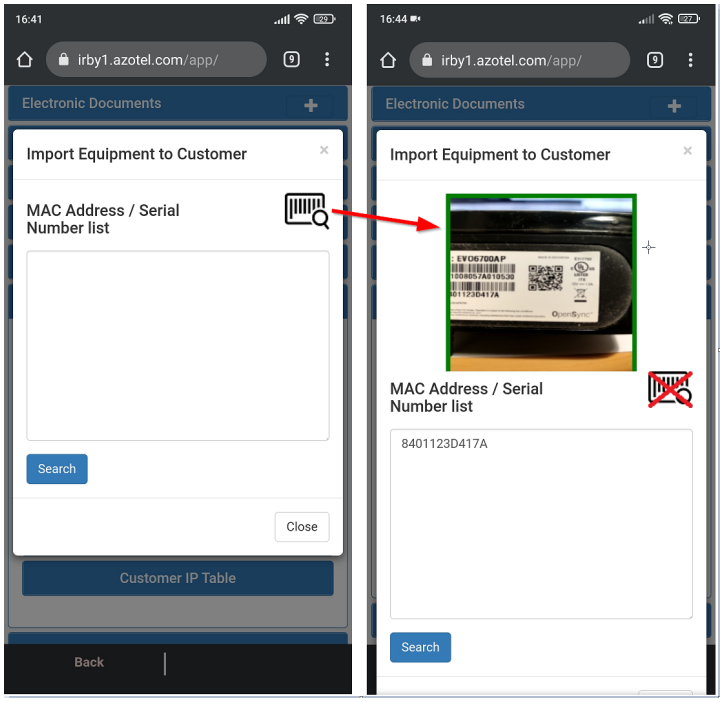


Fig. 14.3.3-3: Adding / Scanning the equipment

- ***Step Four:*** Mobile App will search through equipment that is in stock and provide a list of matching equipment pieces. Review the list that is displayed and ensure that all Plume Nodes that were added/scanned are on the list. If everything checks out proceed by clicking on the ***'Assign'*** button. Otherwise take note of missing equipment pieces as these will have to be added to SIMPLer stock prior to scanning them in (this can only be done from SIMPLer GUI – process is described in chapter 14.5 of this manual).

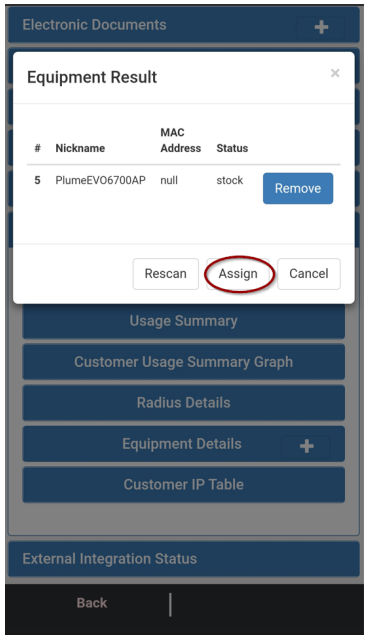


Fig. 14.3.3-4: Assigning equipment

- ***Step Five:*** Customer details page in the Mobille App will be reloaded once assigning process is completed. All Plume Nodes will show up under ***'Network -> Equipment Details'*** section. There will also be an additional ***'External Integration Status'*** section displayed at the bottom where Plume related section will appear. This dedicated Plume section carries some basic information about the customer account in Plume as well as it provides two buttons that take directly to customer page in ***'Plume Frontline Tier 1'*** and ***'Plume Frontline Tier 2&3'***. Next step is to upgrade one of customer Nodes (one that is connected to internet feed) type to ***'Plume Gateway'***. Click on the ***'Edit'*** button in the respective equipment row and change the type from ***'Plume Node'*** to ***'Plume Gateway'***. This step concludes the setup.

  Note: It might also be good to review and update Plume Nodes descriptions as these will be pushed to Plume as Node labels. Having them reflect an actual location in the customers Home/Office with floor markings might greatly improve post installation support processes

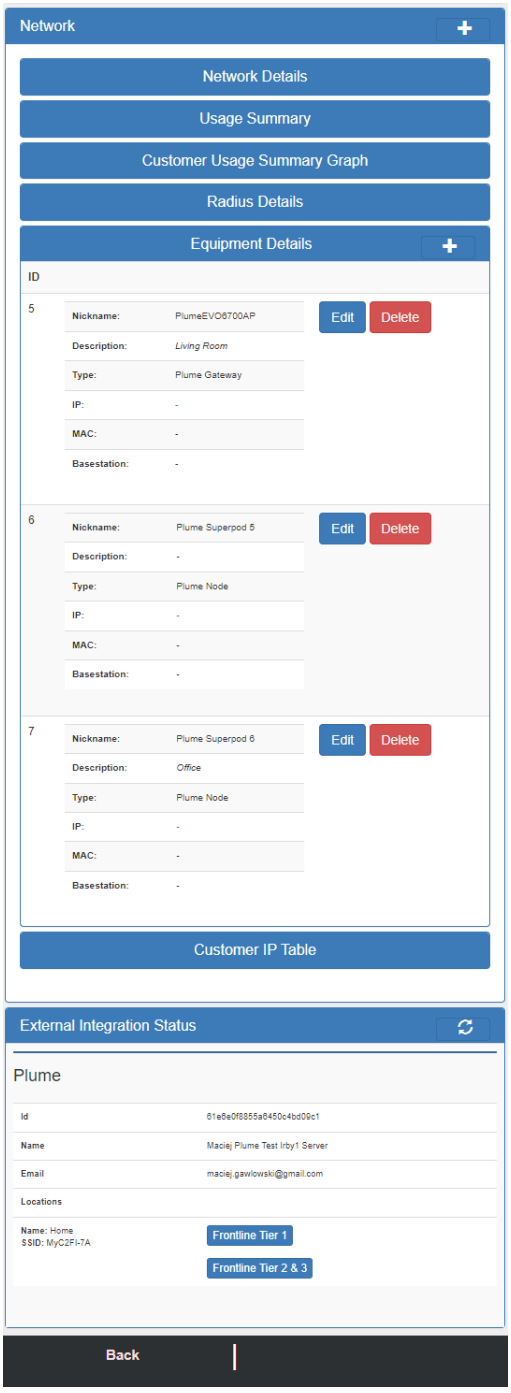


Fig. 14.3.3-5: Assigning equipment

- ***Step Six:*** Above concludes the Plume setup. If applicable – please also change the customer status accordingly to the installation procedure (to 'current' for example). Note that any changes made in SIMPLer or Mobile App will be pushed to Plume API within 3 minutes from the change being submitted.

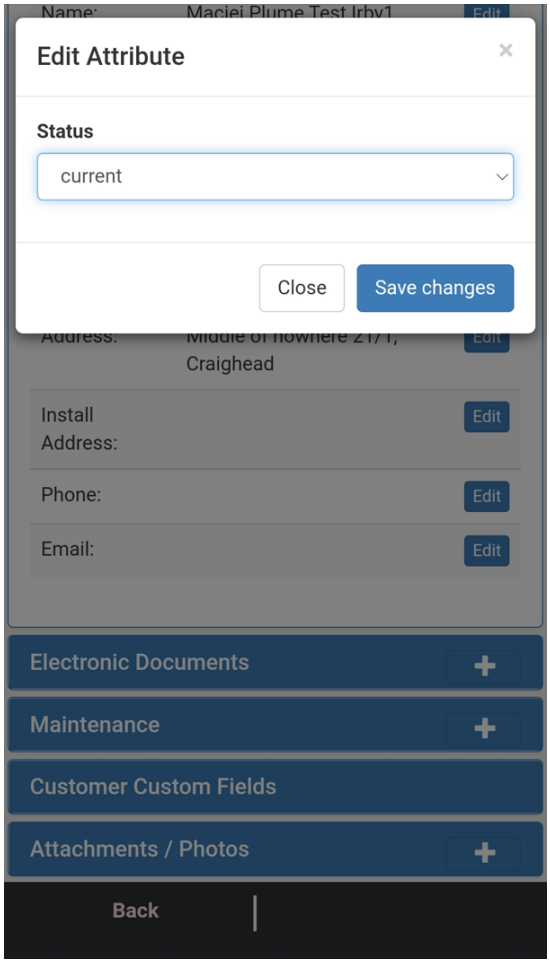


Fig. 14.3.3-6: Assigning equipment

14.4 Import Plume equipment from CSV files

Key thing to note while working with Plume integration is that it requires Plume Nodes being added to customer accounts which means that such equipment must be added to the SIMPLer platform first. Note that the best practice is to batch import all Plume equipment upon receiving it from Plume. This way it will be in stock available for installers to provision when working at customer sites.

Equipment can be imported to the SIMPLer platform from CSV files using the ***'Import Data'*** tool. Use of the import tools has been well described under below entry of Azotel WiKi pages:

http://wiki.azotel.com/simpler-features/features-index-1/import-interface

Note: It is advised to import stock Plume equipment as ***'Plume Node'*** type.

For the benefit of this manual below please find the steps that outline the bulk import process:

- ***Step One***: Click on the 'Import Data' button from the 'Settings' menu in SIMPLer. (See Fig. 14.4-1).

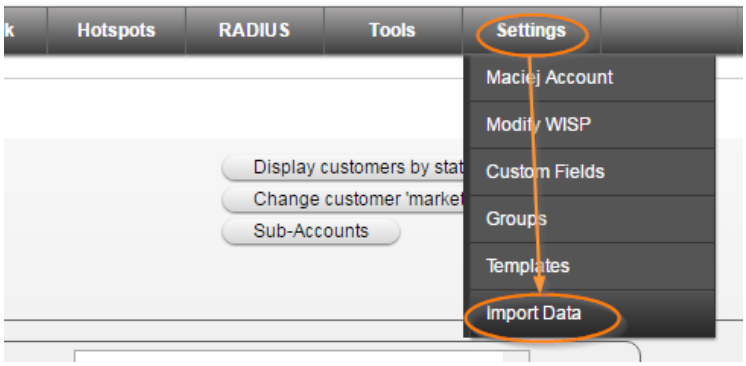


Fig. 14.4-1: Settings – Import Data

- ***Step Two:*** Pick the 'Equipment' option from the 'Table to be populated' dropdown menu. Submit your choice with the 'Load Interface' button. (See Fig. 14.4-2) This will bring up an interface dedicated to uploading Equipment positions to the SIMPLer platform.

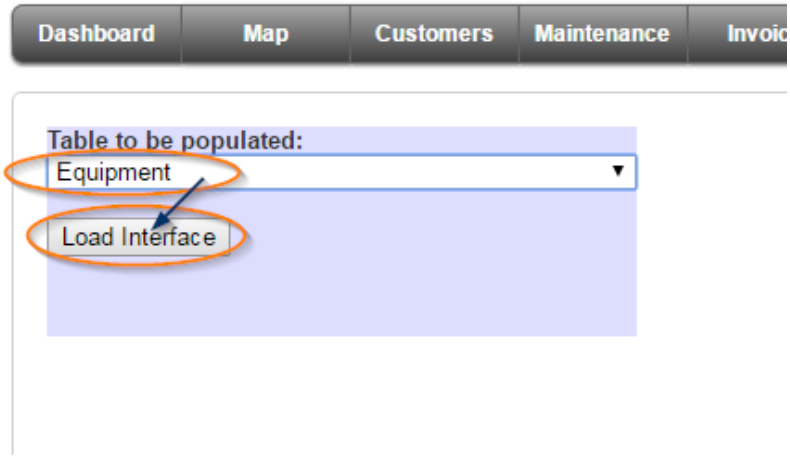


Fig. 14.4-2: Import Data – Equipment

- ***Step Three:*** Prepare the CSV file for upload. For Plume environment it should at least contain the following three columns:
  - **Nickname** – Unique equipment nickname – SIMPLer will not allow duplicates in this field. This must be in the first column of the imported file.
  - **Serial Number** – Serial number as found on equipment piece
  - **Type** – it should be set to 'Plume Node'.

An example CSV file format can be found on the below screenshot (Fig. 14.4-3). To summarise, it must be comma separated with " used as a string delimiter.

```
"plume1","8401123D417A","Plume Node"
"plume2","4H84B00E25","Plume Node"
"plume3","EB85B0096F","Plume Node"
```

Fig. 14.4-3: Example CSV

- ***Step Four:*** Once the CSV file is prepared, columns reflecting the file format should be chosen by double clicking the field name in the left-hand column, you will transfer it to the right-hand column, which represents the fields that will be imported, and then select the file to upload and finally click on the ***'Upload File'*** button to start importing process. (See Fig. 14.4-4).

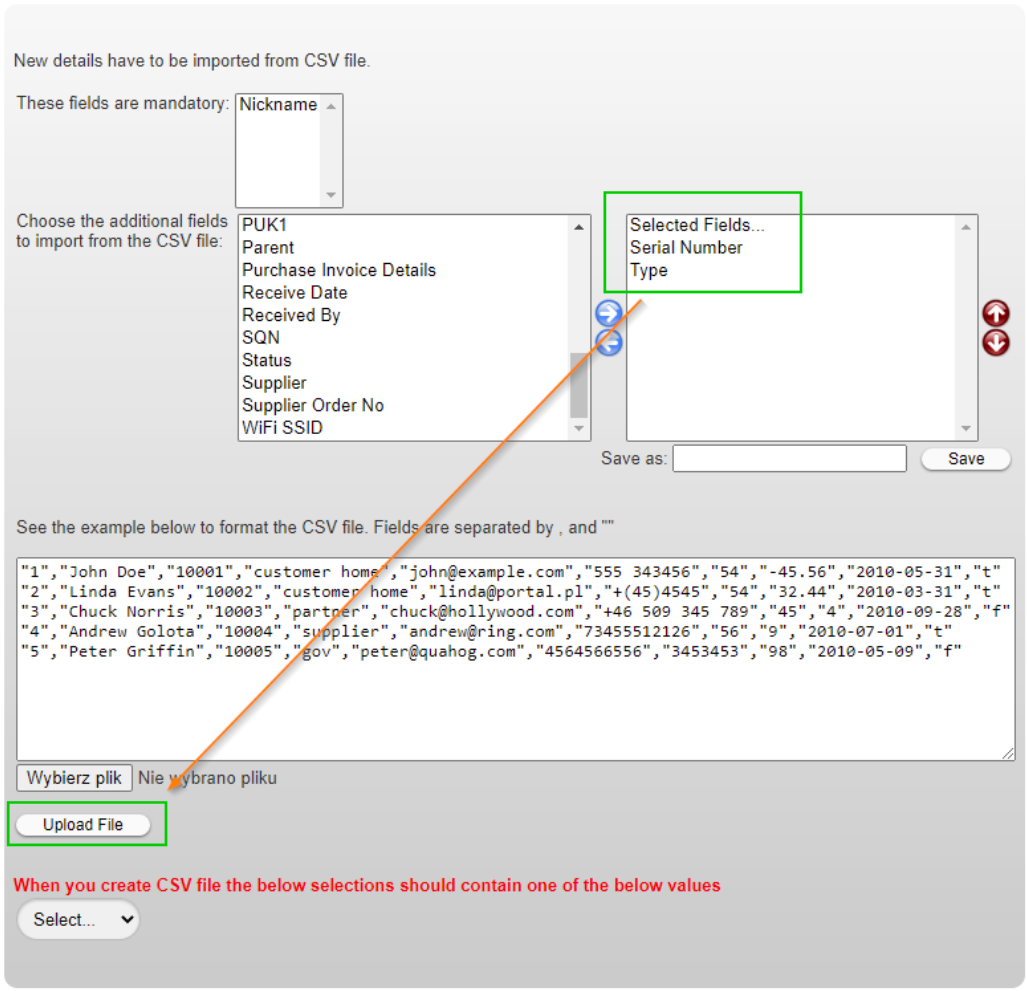


Fig. 14.4-4: Upload File Process

- ***Step Five:*** This will bring a page where data from the uploaded file is interpreted. Any errors will be highlighted and must be corrected before SIMPLer will allow the data set to be imported. Click the 'IMPORT' button once the data set has been reviewed. (See Fig. 14.4-5).

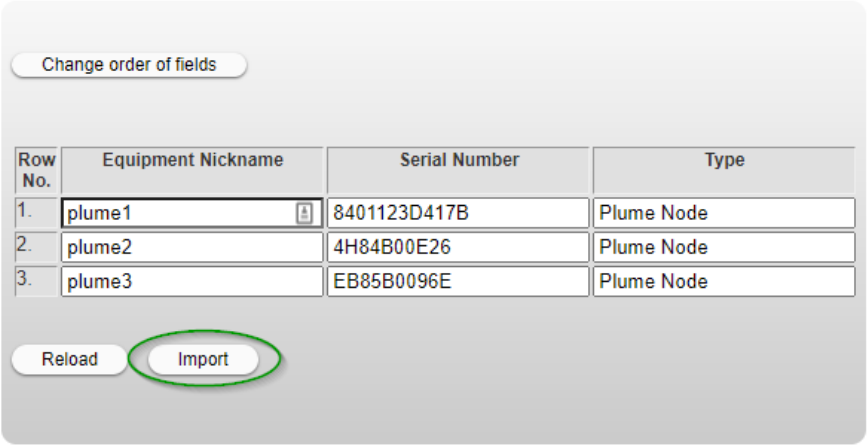


Fig. 14.4-5: File Review and Import

14.5 Add Plume equipment manually

Plume gear as well as any other equipment can also be added to the SIMPLer platform manually. Follow below steps to add a Plume Node to SIMPLer platform:

- ***Step One***: Click on ***'Equipment Details'*** from the ***'Network'*** submenu to navigate the equipment page that lists all equipment available in the operator instance. There click on the ***'Add'*** button. Alternatively you can directly click on the ***'Add New Equipment'*** option from the ***'Network'*** submenu. (See Fig. 14.5-1).

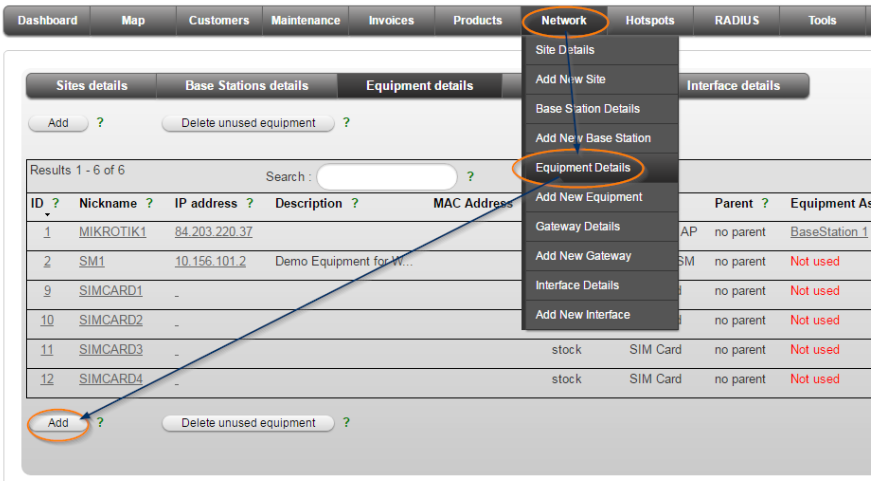


Fig. 14.5-1: File Review and Import

- ***Step Two:*** Fill out the new Plume Node details. Make sure to use ***'Plume Node'*** as the ***'Type'***. The status should be set as ***"stock"*** because this will make it available for selection once installer is ready to assign it to a customer. Once done editing click on the ***'Add'*** button. (See Fig. 14.5-2).

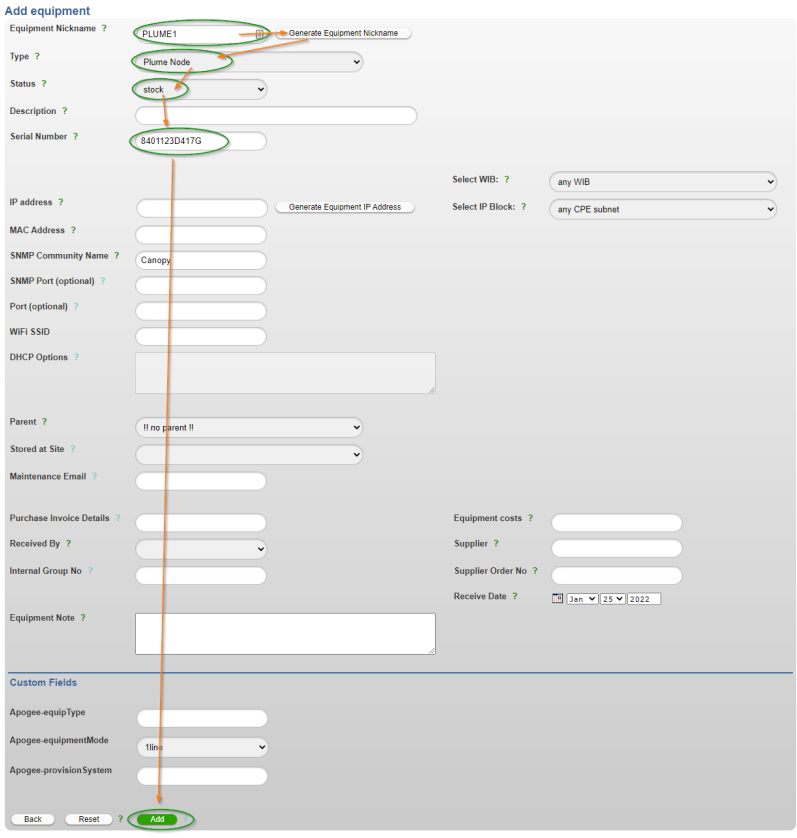


Fig. 14.5-2: Add Plume Node

15 Ericsson EMA CAI Integration for TDD LTE

15.1 Introduction

This section will provide a general outline of the integration available between SIMPLer and the CAI (Customer Authentication Interface) interface for Ericsson TDD LTE deployments. SIMPLer uses this command-based API to synchronize customer SIM Cards to the following EMA components:

- HSS
- HLR
- PCRF
- MINSAT

The Customer Administration Interface (CAI) is an activation interface that provides a simple, up-to-date, and unified provisioning interface for the network elements in telecommunication and or IT networks. It is a command-based telnet service interface. This integration is focused on its TDD LTE management side i.e., SIM Cards provisioning.

Customers are using LTE devices with SIM Cards inserted. It is the SIM Card details that are used to authenticate the customer on to the TDD LTE network – CPE's can be swapped upon failure – so long as the SIM Card remains the same – it will be authenticated seamlessly after the swap. Upon authentication the CPE sends the SIM Card details to LTE Access Point which forwards the SIM Card identity to the Ericsson EPC. If a particular user (SIM Card) is set on the EMA server – the CPE it is on will get authenticated to the LTE network.

Note that the integration is limited by the CAI interface capabilities and unfortunately no usage / session figures are available in SIMPLer as it is a provision only interface.

15.2 EMA CAI trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page. This setup should be carried out by Azotel engineers. Please get in touch with Azotel to discuss your requirements.

Mandatory Settings:

Before setting up the EMA CAI trigger, the below API access details must be obtained:

- ***API_IP*** – IP address under which Ericsson CAI interface is hosted
- ***API_PORT*** – Port number under which Ericsson CAI interface is available
- ***API_USER*** – Username SIMPLer platform should send to authenticate with the API
- ***API_PASSWORD*** – Password related to the Username

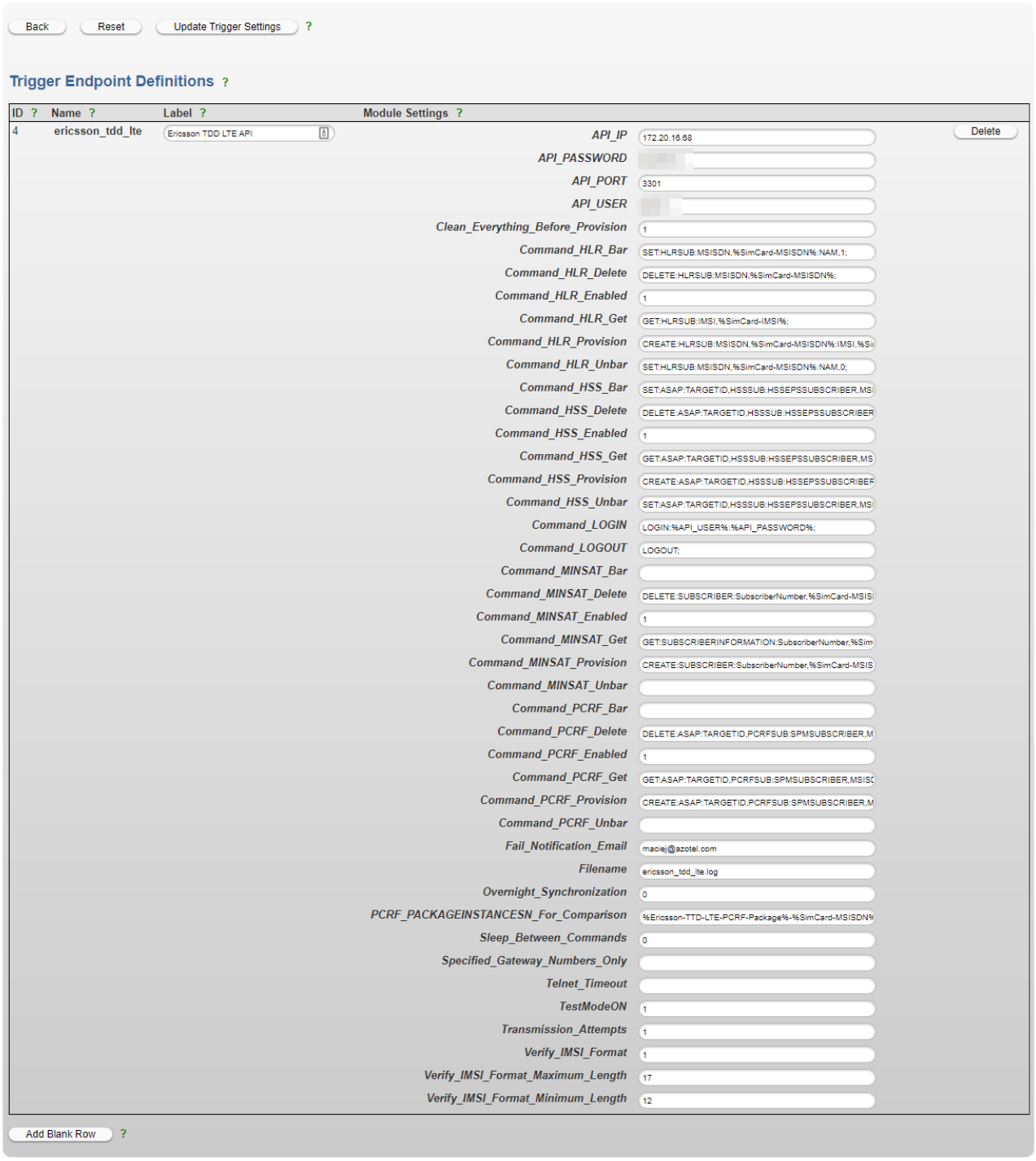


Fig. 15.2.1 Example Ericsson CAI API configuration entry

Optional Settings:

Below is a set of additional global attributes that can be defined for the API module:

- ***Telnet_Timeout*** – use this attribute to define a timeout (in seconds) on Telnet communication that helps prevent the API interface from stalling upon communication issues. It will default to 20
- ***Sleep_Between_Commands*** – use this attribute to introduce a 'sleep' / 'wait' time in between commands that are submitted via EMA CAI API
- ***TestModeON*** – if enabled API interface will try to submit all commands from the queue even if one or more of them failed and afterwards it will try to roll them back. If left disabled, which is the default, upon first

failure no further commands will be executed and everything that had succeeded to this point will be rolled back

- ***Clean_Everything_Before_Provision*** – this option can be used in an environment where SIMPLer is taking over existing SIM Cards. In such case if would be good to clean all EMA components first and then provision a SIM Card from scratch
- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures shall be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization*** **–** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with EMA server. This option is not recommended unless there are multiple communication issues between SIMPLer and EMA CAI API.
- ***Specified_Gateway_Numbers_Only*** – this attribute allows operator to narrow down the trigger to selected gateways only
- ***Transmission_Attempts*** **-** specifies how many times system should retry submitting updates via API upon communication failures. Should be populated with a number. It is set to 2 by default.
- ***Verify_IMSI_Format*** **-** defines if the IMSI check is to be performed. If set to yes – integration module will ensure that the IMSI consists only of numbers and adheres to the minimum, maximum length (as defined below)
- ***Verify_IMSI_Format_Maximum_Length*** **-** defines maximum length of an IMSI. SIM Card will not be provisioned in the EMA CAI if the length of its IMSI is less than the defined value. Recommended default is 17
- ***Verify_IMSI_Format_Minimum_Length*** **-** defines minimum length of an IMSI. SIM Card will not be provisioned in the EMA CAI if the length of its IMSI is less than the defined value. Recommended default is 14
- ***Command_HLR_Enabled*** **–** this flag enables the HLR component provisioning
- ***Command_HSS_Enabled*** **–** this flag enables the HSS component provisioning
- ***Command_MINSAT_Enabled*** **–** this flag enables the MINSAT component provisioning
- ***Command_PCRF_Enabled*** **–** this flag enables the PCRF component provisioning
- ***PCRF_PACKAGEINSTANCESN_For_Comparison*** - %Ericsson-TTD-LTE-PCRF-Package%-%SimCard-MSISDN%

Command Settings:

EMA CAI interface allows tweak/redefine commands for each component provisioned on 'per operator' basis to account for subtle changes some operators might require for EMA CAI commands. Below are the command settings with their respective defaults:

- ***Command_LOGIN***
  `LOGIN:%API_USER%:%API_PASSWORD%;`
- ***Command_LOGOUT***
  `LOGOUT;`
- ***Command_HLR_Get***
  `GET:HLRSUB:IMSI,%SimCard-IMSI%;`
- ***Command_HLR_Provision***
  `CREATE:HLRSUB:MSISDN,%SimCard-MSISDN%:IMSI,%SimCard-IMSI%:PROFILE,%Ericsson-TTD-LTE-HLR-Profile%;/DELETE:HLRSUB:MSISDN,%SimCard-MSISDN%;`
- ***Command_HLR_Delete***
  `DELETE:HLRSUB:MSISDN,%SimCard-MSISDN%;`
- ***Command_HLR_Bar***
  `SET:HLRSUB:MSISDN,%SimCard-MSISDN%:NAM,1;`
- ***Command_HLR_Unbar***
  `SET:HLRSUB:MSISDN,%SimCard-MSISDN%:NAM,0;`
- ***Command_HSS_Get***
  `GET:ASAP:TARGETID,HSSSUB:HSSEPSSUBSCRIBER,MSISDN,%SimCard-MSISDN%;`
- ***Command_HSS_Provision***
  `CREATE:ASAP:TARGETID,HSSSUB:HSSEPSSUBSCRIBER,MSISDN,%SimCard-MSISDN%,KEY,%SimCard-IMSI%,DEFAULT_RECORD_NAME,%Ericsson-TTD-LTE-HSS-`

Profile%;/DELETE:ASAP:TARGETID,HSSSUB:HSSEPSSUBSCRIBER,MSISDN,%SimCard-MSISDN%;

- ***Command_HSS_Delete***
  DELETE:ASAP:TARGETID,HSSSUB:HSSEPSSUBSCRIBER,MSISDN,%SimCard-MSISDN%;
- ***Command_HSS_Bar***
  SET:ASAP:TARGETID,HSSSUB:HSSEPSSUBSCRIBER,MSISDN,%SimCard-MSISDN%,EPS_SUBSCRIPTION_ENABLED,0;
- ***Command_HSS_Unbar***
  SET:ASAP:TARGETID,HSSSUB:HSSEPSSUBSCRIBER,MSISDN,%SimCard-MSISDN%,EPS_SUBSCRIPTION_ENABLED,1;
- ***Command_MINSAT_Bar***
  no bar command by default
- ***Command_MINSAT_Delete***
  DELETE:SUBSCRIBER:SubscriberNumber,%SimCard-MSISDN%:EnableAF,FALSE:DisconnectionCode,1;
- ***Command_MINSAT_Get***
  GET:SUBSCRIBERINFORMATION:SubscriberNumber,%SimCard-MSISDN%;
- ***Command_MINSAT_Provision***
  CREATE:SUBSCRIBER:SubscriberNumber,%SimCard-MSISDN%:IMSI,%SimCard-IMSI%:SIM,%SimCard-ICCID%:PUK1,%SimCard-PUK1%:BusinessPlan,%Ericsson-TTD-LTE-Business-Plan%:TempBlockingStatus,CLEAR:EnableAF,FALSE:OrganizationID,1;/DELETE:SUBSCRIBER:SubscriberNumber,%SimCard-MSISDN%:EnableAF,FALSE:DisconnectionCode,1;
- ***Command_MINSAT_Unbar***
  no unbar command by default
- ***Command_PCRF_Bar***
  no bar command by default
- ***Command_PCRF_Delete***
  DELETE:ASAP:TARGETID,PCRFSUB:SPMSUBSCRIBER,MSISDN,%SimCard-MSISDN%;
- ***Command_PCRF_Get***
  GET:ASAP:TARGETID,PCRFSUB:SPMSUBSCRIBER,MSISDN,%SimCard-MSISDN%;
- ***Command_PCRF_Provision***
  CREATE:ASAP:TARGETID,PCRFSUB:SPMSUBSCRIBER,MSISDN,%SimCard-MSISDN%,IMSI,%SimCard-IMSI%,TARIFFID,%Ericsson-TTD-LTE-Triffid%:PACKAGEINSTANCE,PACKAGEINSTANCESN,%Ericsson-TTD-LTE-PCRF-Package%-%SimCard-MSISDN%,PACKAGETITLE,%Ericsson-TTD-LTE-PCRF-Package%,CYCLERESETTIME,%Ericsson-TTD-LTE-Cycle-Reset-Time%,TOTALUSEDVOLUME,0;/DELETE:ASAP:TARGETID,PCRFSUB:SPMSUBSCRIBER,MSISDN,%SimCard-MSISDN%;
- ***Command_PCRF_Unbar***
  no unbar command by default

The Ericsson CAI integration requires following triggers to be enabled as a part of the configuration process (Fig. 15.2.2):

- ***RADIUS Username Change*** – enabling this trigger is required to synchronize SIM Cards assigned to customer accounts.

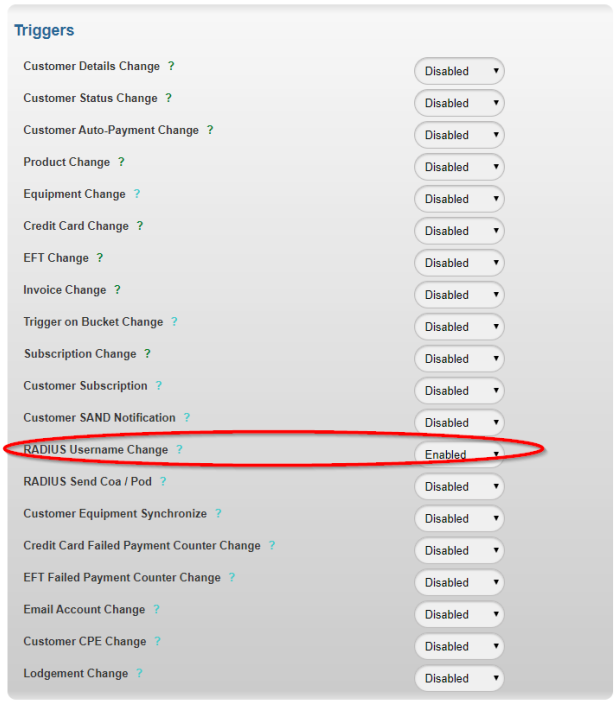


Fig. 15.2.2 RADIUS Username Change enabled

Note: Usage figures cannot be polled with the Ericsson CAI interface as the feature is not supported by it yet. Once/if it is added to the API, it will be added to the integration module.

15.3 Customer Account Setup

A correctly set and working customer account will have the following details set under the SIMPLer platform:

- ***Gateway*** – The gateway used must be RADIUS enabled, as the synchronization with the EMA CAI integration uses the SIMPLer RADIUS server to store synchronized accounts
- ***Bucket*** – Preferably mapped to a RADIUS group for automation purposes (i.e. changing profiles in EMA components based on bucket the customer is assigned to).
- ***SimCard*** – SimCard must at least have following attributes defined:
  - ***IMSI***
  - ***MSISDN***
  - ***ICCID***
  - ***PUK1***

Once the above conditions are met, the account from SIMPLer will be synchronized to the EMA via CAI interface successfully.

Below please find the steps required to set up a customer account in SIMPLer with a SIM Card:

- **Step One**: Change the customer gateway to the 'Radius Enabled Gateway' (See Fig. 15.3-1) and change the bucket to whatever it should be for the particular customer, unless the bucket is subscription driven in which case please make sure an appropriate subscription has been set under the customer account.

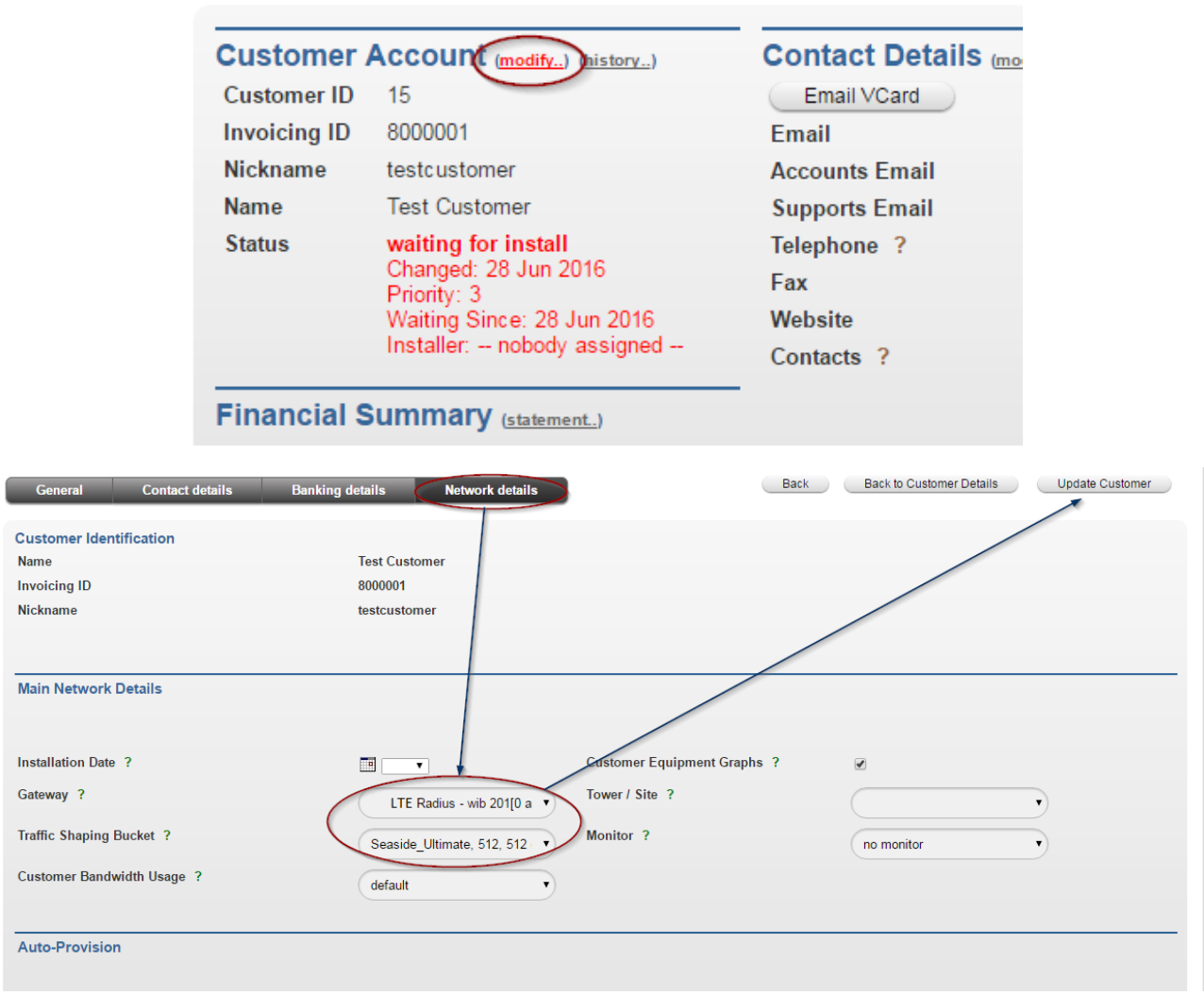


Fig. 15.3-1: Selecting 'RADIUS Enabled' Gateway

Note: Once the customer gateway / bucket changes have been submitted a RADIUS subsection will appear under the network details on customer details page (See Fig 15.3.3).

- ***Step Two:*** In cases where buckets are subscription driven, please ensure that customer has the 'Ericsson TDD LTE internet' related product added to 'Subscription Details'

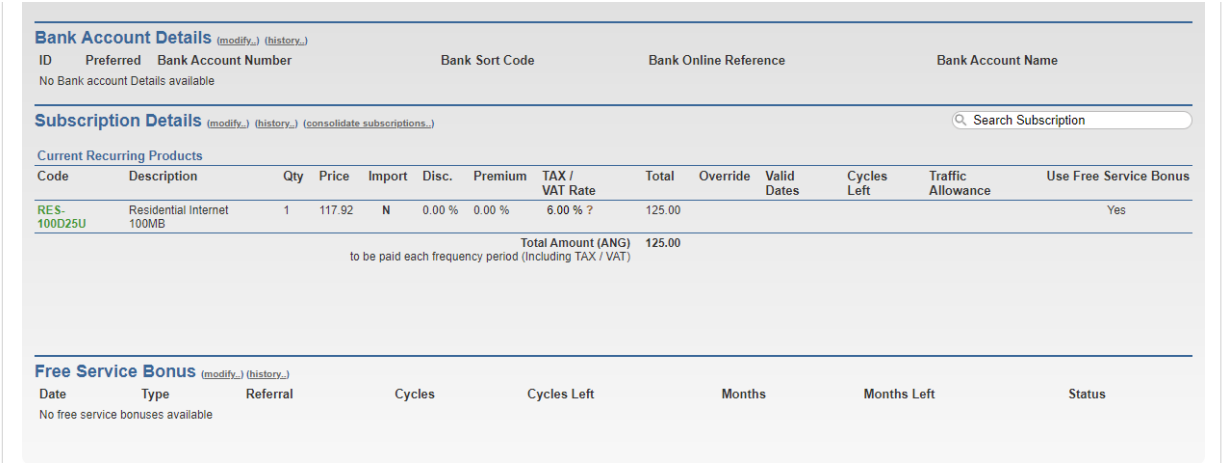


Fig. 15.3.2: Customer subscriptions

- ***Step Three:*** Click on the 'modify' link next to the Equipment Details. This takes the operator to the customer equipment management page. (See Fig. 15.3.3)

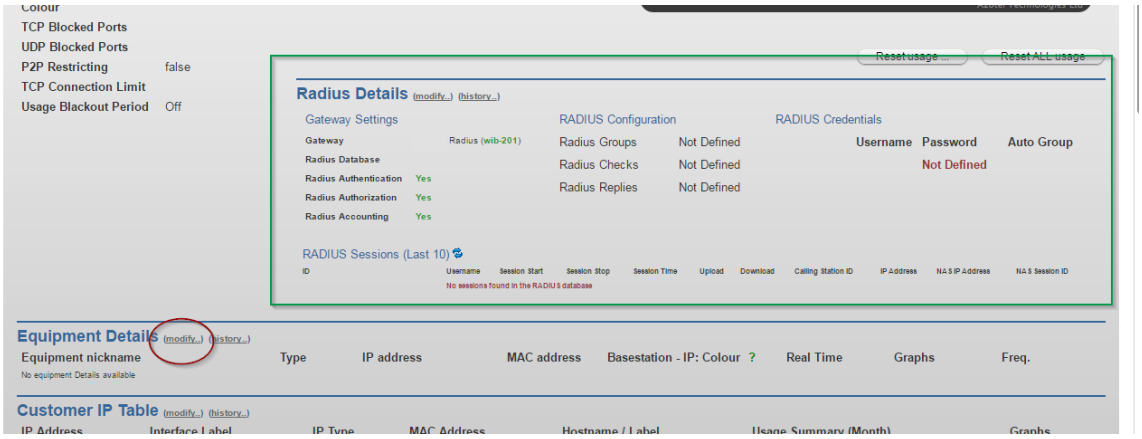


Fig. 15.3.3: Modify Equipment

- ***Step Four:*** Find SIM Card that the respective customer is using and click on the 'Add' button next to it to add to the customer assigned equipment. All equipment in "stock" will be available for selection here. (See Fig. 15.3.4).

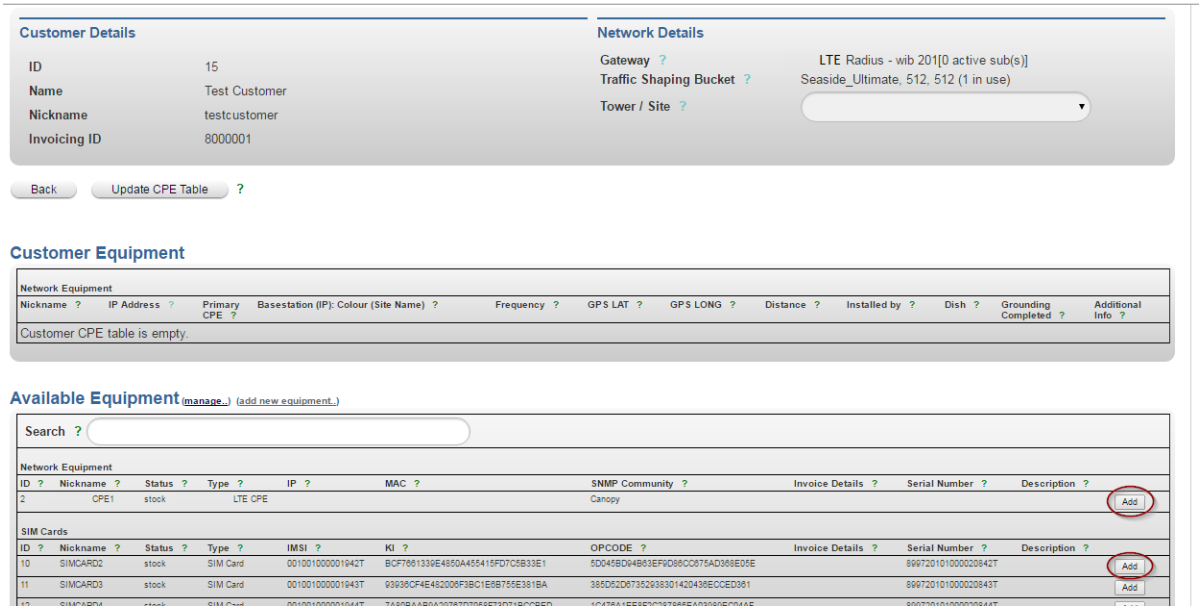


Fig. 15.3.4 : Add SIM Card

- ***Step Five:*** After the above step is completed a RADIUS Details section will appear under customer details fully set with appropriate credentials (based on SIM Card IMSI attribute) as well as there being an entry in the 'Equipment Details' table. (See Fig. 15.3.5).

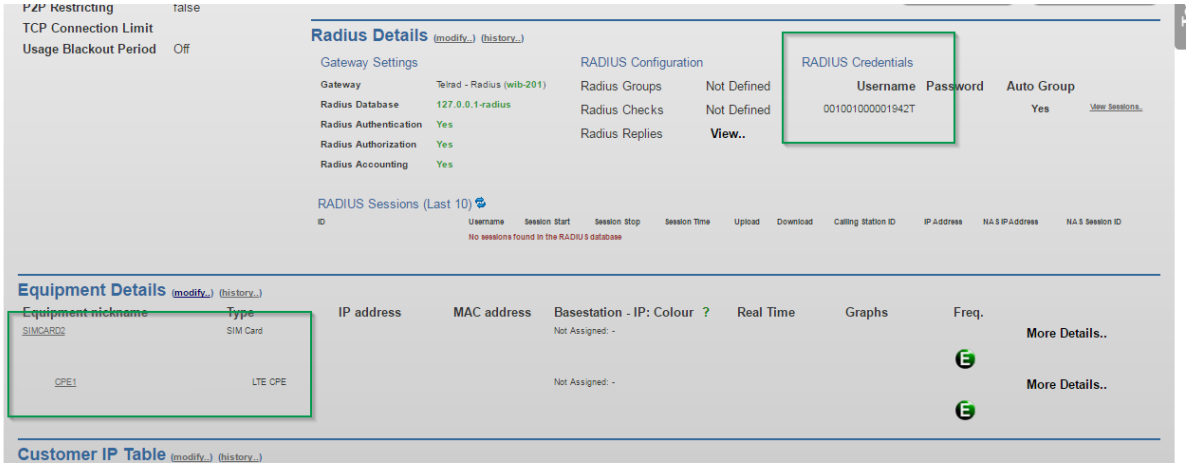
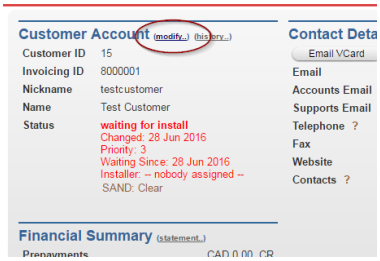


Fig. 15.3.5: RADIUS Credentials

- **Step Six**: Note that only 'current' customers will be provisioned by the EMA CIA interface. It might make sense to change the customer account status to 'current' while installing. Accounts for customers in any other state than 'current' will be put into a 'barred' state in the EMA.



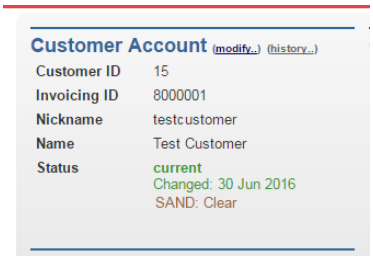


Fig. 15.3.6: Current Status

15.4 Buckets / Products / RADIUS Attributes

RADIUS groups attached to a bucket as well as subscriptions define how the EMA CAI is provisioned. This setup that should be carried out by Azotel engineers. Please get in touch with Azotel to discuss your requirements.

Below is a list of supported RADIUS attributes that can be used to set and fine tune all aspects of a customer account in EMA CAI. Radius attributes can be assigned individually from each customer account or tied to a bucket (subscription).

- ***Ericsson-TTD-LTE-Enabled*** - enables Ericsson EMA CAI API communication – must be set for a radius username if we want to synchronize it to EMA via CAI interface
- ***Ericsson-TTD-LTE-HLR-Profile*** – SIM Card profile that is to be used in HLR CAI command. It will replace any %Ericsson-TTD-LTE-HLR-Profile% tokens found in CAI commands
- ***Ericsson-TTD-LTE-HSS-Profile*** – SIM Card profile that is to be used in HSS CAI command. It will replace any %Ericsson-TTD-LTE-HSS-Profile% tokens found in CAI commands

- ***Ericsson-TTD-LTE-PCRF-Package*** – SIM Card package that is to be used in PCRF CAI command. It will replace any %Ericsson-TTD-LTE-PCRF-Package% tokens found in CAI commands
- ***Ericsson-TTD-LTE-Triffid*** – defines Tariffid attribute used in PCRF CAI command. It will replace any %Ericsson-TTD-LTE-Tariffid% tokens found in CAI commands
- ***Ericsson-TTD-LTE-Cycle-Reset-Time*** – defines Cycle Reset Time attribute used in PCRF CAI command. It will replace any %Ericsson-TTD-LTE-Cycle-Reset-Time% tokens found in CAI commands
- ***Ericsson-TTD-LTE-Business-Plan*** – defines Business Plan attribute used in MINSAT CAI command. It will replace any %Ericsson-TTD-LTE-Business-Plan% tokens found in CAI commands
- ***Ericsson-TTD-LTE-SDP*** – defines SDP attribute used in MINSAT CAI command. It will replace any %Ericsson-TTD-LTE-SDP% tokens found in CAI commands

16 Vetro Integration

16.1 Introduction

This section will give a general outline of the integration available between SIMPLer and Vetro Fibermap. The VETRO Platform offers a complete fiber management solution. VETRO's key features are used in three critical areas of network operations: planning and design, Inventory and documentation, and operationalizing map data. More information can be found at the following web page:

https://vetrofibermap.com/

The Azotel integration module for Vetro allows the achievement of the following:

- display live data from Vetro on Customer details page
- use the live data from Vetro to update any specified fields of the customer record (whether these are custom or regular fields)

16.2 Vetro trigger setup

Note: Please refer to chapter 2.3 for the External API Trigger configuration page. This setup is best carried out by Azotel engineers. Please get in touch with Azotel to discuss your requirements.

Mandatory Settings:

Before setting up the Vetro trigger, the below API access details must be obtained:

- ***API_URL*** – URL of the Vetro API. Will default to: ***https://fibermap.vetro.io/v2***
- ***API_Username*** – Username SIMPLer platform should send to authenticate with the Vetro API

- ***API_ Password*** – Password related to the Username
- ***API_Token*** - database instance token as provided by Vetro
- ***Vetro_Admin_GUI*** – link to the Vetro Fibermap GUI. Will default to: ***https://fibermap.vetro.io/map#14.52***

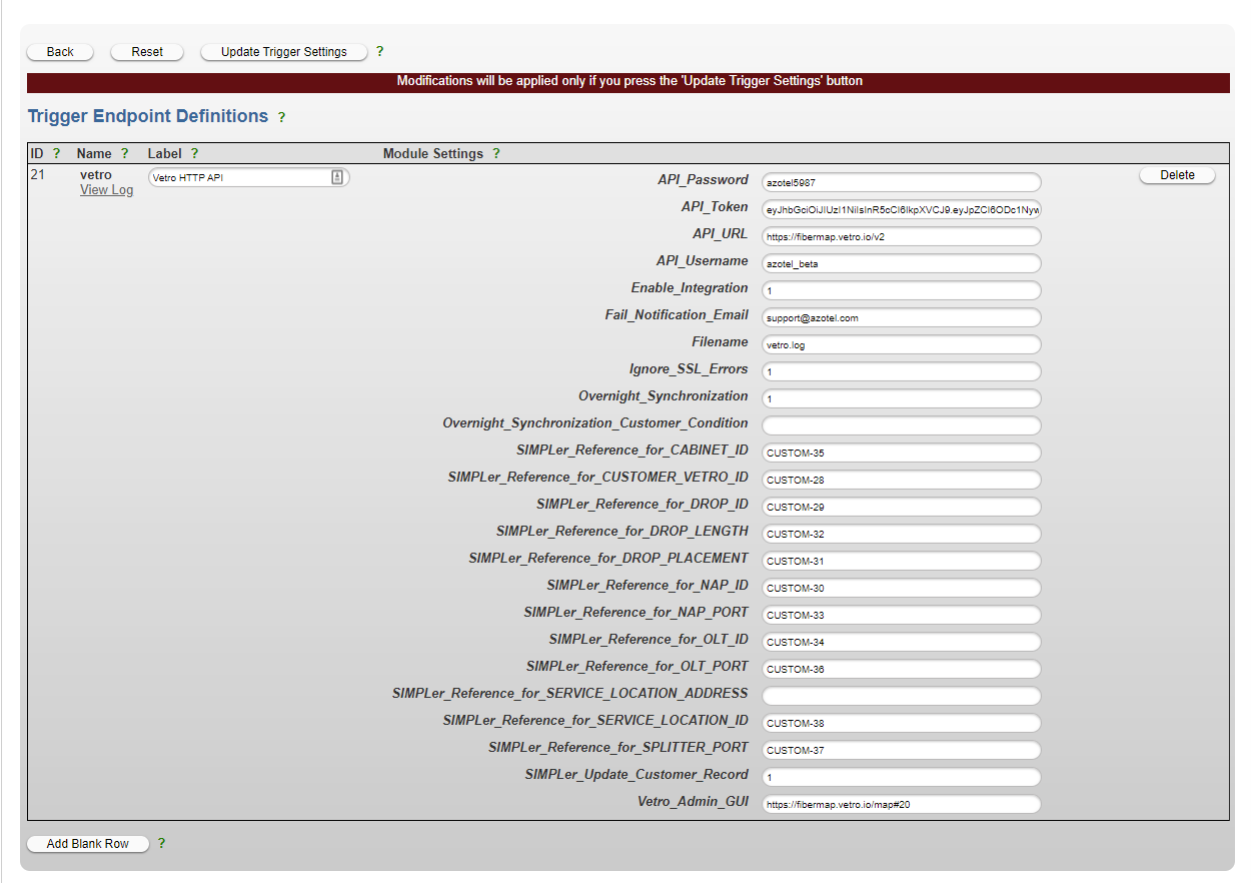


Fig. 16.2.1 Example Vetro API configuration entry

Optional Settings:

Below listed is a set of additional global attributes that can be defined for the API module:

- ***Enable_Integration*** –flag that can be used to enable / disable the integration
- ***Ignore_SSL_Errors –*** flag that allows to ignore SSL errors in case the API certificate expires
- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures will be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent.
- ***Filename*** – name for a log file to store base operation details performed through the interface.
- ***Overnight_Synchronization –*** enables overnight synchronization process if set to "1". During this synchronization all customer records are being re-synchronized with Vetro server. This option is not recommended to use unless there are multiple communication issues between SIMPLer and Vetro API.
- ***Overnight_Synchronization_Customer_Condition*** – allows to define an SQL condition that will limit customers that will be checked by the overnight process (in cases where customer fields are updated from Vetro). Example – to check only 'current' customer accounts use the following condition: `customerstatus[1]='current'`
- ***SIMPLer_Update_Customer_Record*** – flag that enables a feature updating specified customer details with Live data from Vetro if what we have in SIMPLer is different to what is found in Vetro

Field Update Settings:

Below listed is a set of SIMPLer customer record fields that are to be updated with live information from Vetro if what we have in SIMPLer is different to what is found in Vetro. By default these fields are undefined which means that nothing will be updated in SIMPLer. Operator should make use a comma separated list of SIMPLer customer record fields. These will be compared against what is coming from Vetro and updated if needs be.

Note that if any of below are being returned as empty from Vetro – whatever is in SIMPLer will remain as is (it will not be updated).

- ***SIMPLer_Reference_for_CABINET_ID***
- ***SIMPLer_Reference_for_CUSTOMER_VETRO_ID*** ***CUSTOM-194***
- ***SIMPLer_Reference_for_DROP_ID*** ***CUSTOM-195***
- ***SIMPLer_Reference_for_DROP_LENGTH***
- ***SIMPLer_Reference_for_DROP_PLACEMENT***
- ***SIMPLer_Reference_for_NAP_ID*** ***CUSTOM-197***
- ***SIMPLer_Reference_for_NAP_PORT***
- ***SIMPLer_Reference_for_OLT_ID***
- ***SIMPLer_Reference_for_OLT_PORT***
- ***SIMPLer_Reference_for_SERVICE_LOCATION_ADDRESS***
- ***SIMPLer_Reference_for_SERVICE_LOCATION_ID*** ***CUSTOM-196***
- ***SIMPLer_Reference_for_SPLITTER_PORT***

Below is a list of customer record fields in SIMPLer that can be used to configure the above:

- ***CUSTOM-XX*** – where XX should be replaced with an ID of whatever custom field needs to be synchronized
- ***NICKNAME***
- ***INVOICINGID***
- ***NAME***
- ***PHONE***
- ***FAX***
- ***EMAIL***
- ***WEBSITE***
- ***COMMUNITY_CODE***
- ***INSTALLATION_AREA***
- ***CUSTOMER_TRACKING***
- ***MARKETINGCODE***
- ***NOTE***
- ***PRIVATENOTE***
- ***GPSX***
- ***GPSY***
- ***FOLDER***

Example field configuration:

SIMPLer_Reference_for_SERVICE_LOCATION_ADDRESS : INSTALLATION_AREA, CUSTOM-197

SIMPLer_Reference_for_OLT_ID: CUSTOM-197

The Vetro integration requires following triggers to be enabled as a part of the configuration process (Fig. 16.2.2):

- ***Customer Status*** – enabling this trigger is required to synchronize customer status assigned to customer accounts.

It also makes sense to enable the ‘Enabled Overnight Sync’ flag next to the above triggers to ensure that the API is consulted overnight for the whole customer base in cases where the ‘***SIMPLer_Update_Customer_Record’*** is enabled.

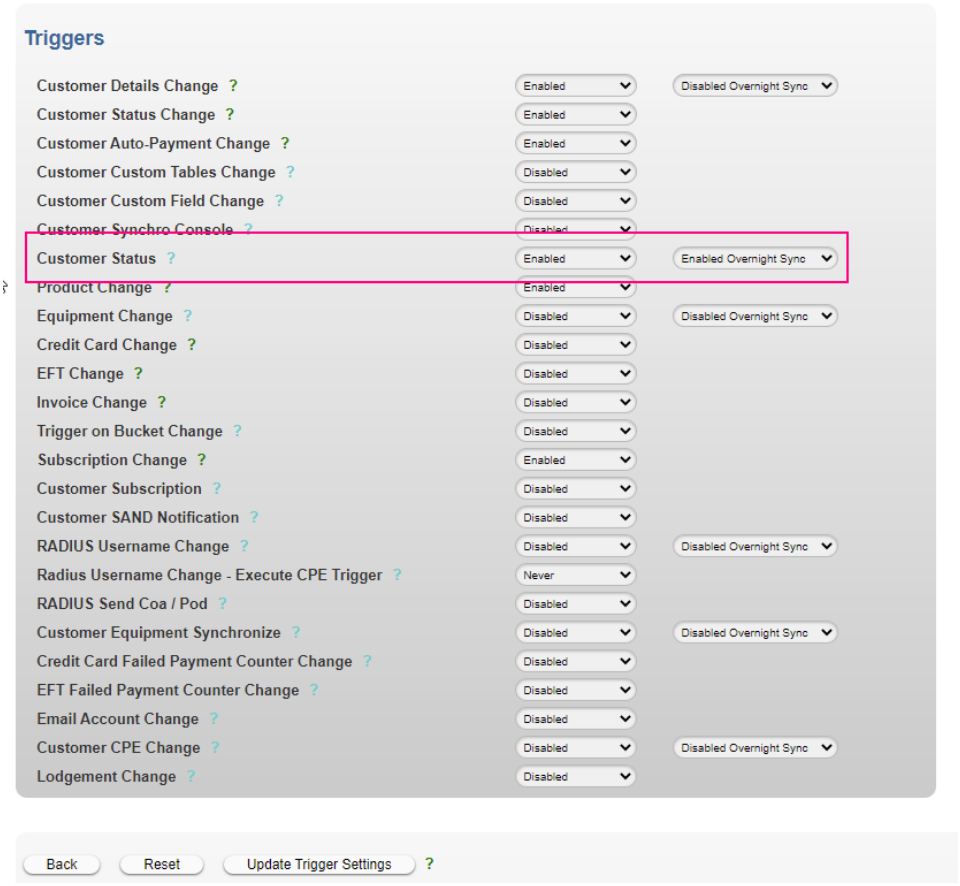


Fig. 16.2.2 Customer Status enabled

Note that when working with Vetro one Custom Field i.e. '***Vetro ID'*** must be set in SIMPLer and filled out for every customer that exists in Fibermap. This field should contain the customer ID as defined in Vetro. It will be used to search for the customer account as well as all Fibre connection details via the API. The operator can also add other Vetro related fields and get these synchronized with the API integration. The full set of supported fields can be found on the below screenshot:

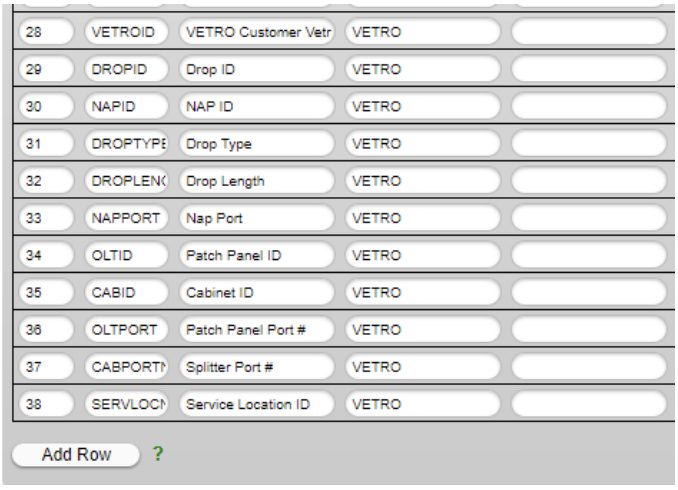


Fig. 16.2.3 Customer Status enabled

16.3 Customer Account Setup

A correctly set and working customer account will have the following details set within the SIMPLer platform:

- ***Vetro ID***

From the Vetro API integration perspective this is the sole field that needs to be present under the customer account in SIMPLer . It will be used to search for a customer record in Vetro. When present in SIMPLer and found in Vetro – a 'Vetro Live Data' section will be displayed under the customer details page in SIMPLer. If data synchronization was configured – the module will also update the respective fields in SIMPLer with live data from Vetro.

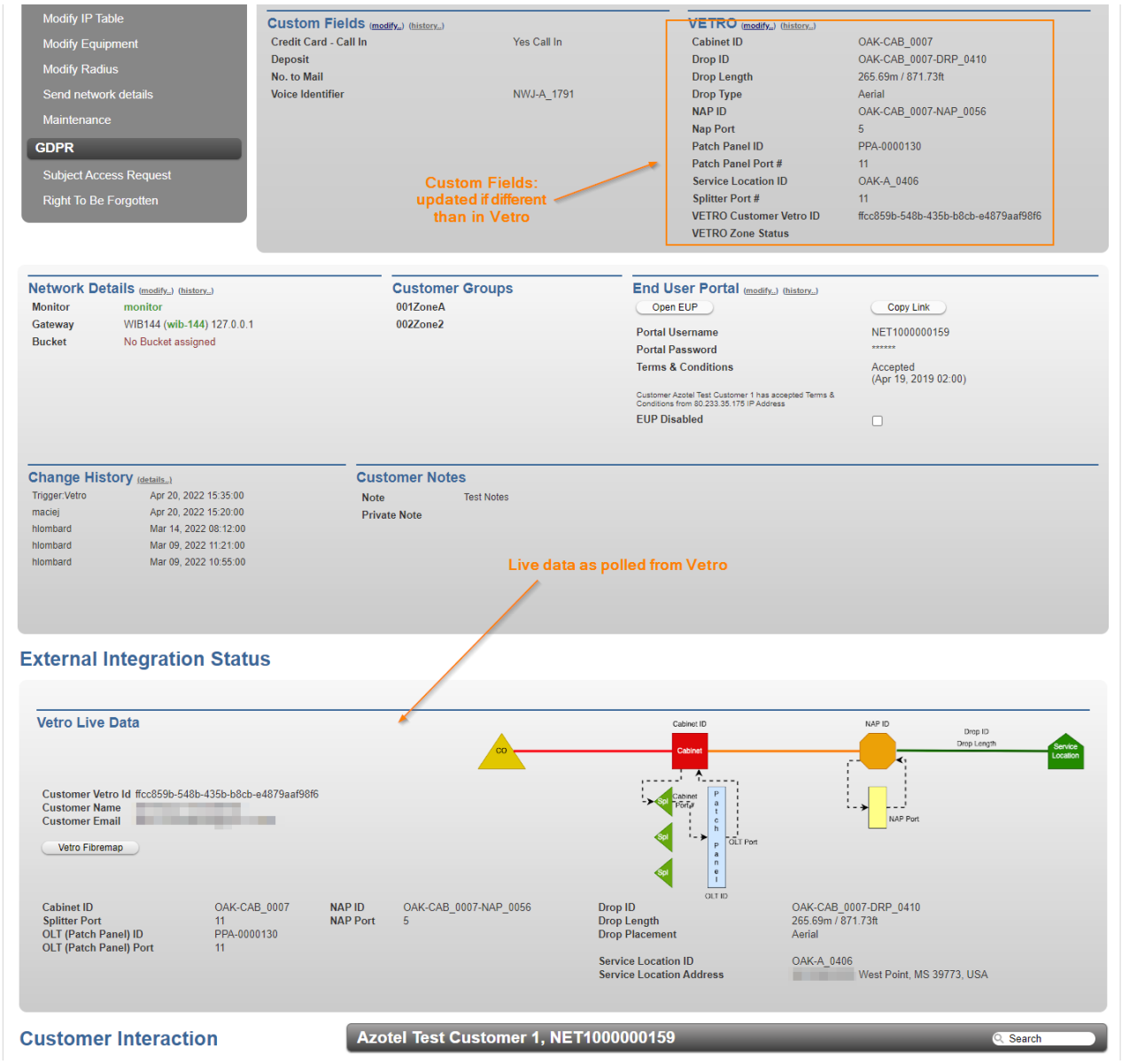


Fig. 16.3.1 Vetro live data on Customer details

17 ISC DHCPD

17.1 Introduction

This section will give a general outline of the integration available between SIMPLer and an ISC DHCPD service based server.

"ISC DHCP offers a complete open source solution for implementing DHCP servers, relay agents and clients. ISC DHCP supports both IPv4 and IPv6 and is suitable for use in high-volume and high-reliability applications. DHCP is available for free download under the terms of the MPL 2.0 license"

https://www.isc.org/dhcp/

The Azotel integration module for ISC DHCPD allows the achievement of the following:

- generate both dhcp.conf and dhcpd6.conf configuration files for dhcpd service
- upload the the configuration files to the dhcpd based server via:
  - sftp
  - ftps
- we can also provide a script that deployed on the DHCP server, will help reload the dhcpd service upon detecting the configuration change

17.2 DHCPD integration setup

Setting the trigger for ISC DHCPD requires setting up following things:

- External File Storage
- API interface & Trigger configuration
- Deploy auto-reload script on the dhcpd server
- Gateway Custom DHCP Config

17.2.1 External File Storage setup

SIMPLer can send generated configuration files via eiher ftps or sftp.

Please setup one of above methods of receiving the configuration files on the dhcpd server and than proceed in SIMPLer to ***"Settings => External File Storage"*** page. Click on ***"Add Blank Row",*** pick the file transfer method that matches what has been used on the dhcpd server (i.e. sftp or ftps) and finally fill out the details to match the dhcpd server setup. Once one go back to External File Storage and make a note of the ID, in the below example - 1

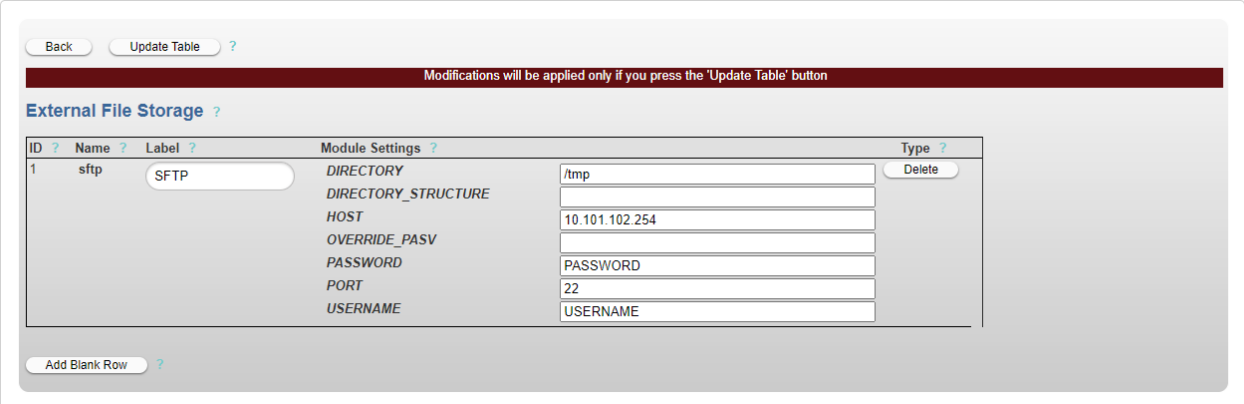


Fig. 17.2.1.1 External File Storage

17.2.2 API interface & Trigger configuration

Note: Please refer to chapter 2.3 for the External API Trigger configuration page details.

Mandatory Settings:

- ***Config_Filename*** – name of the file that will be stored remotely after generation. Typically it will be dhcpd.conf or dhcpd6.conf. Note that two separate API configuration entries need to be set if both v4 and v6 configuration files are to be generated
- ***External_Storage_ID*** – ID of the external storage as set in the above step
- ***IPv6*** – IPv6 configuration file will be generated if enabled otherwise it will default to IPv4

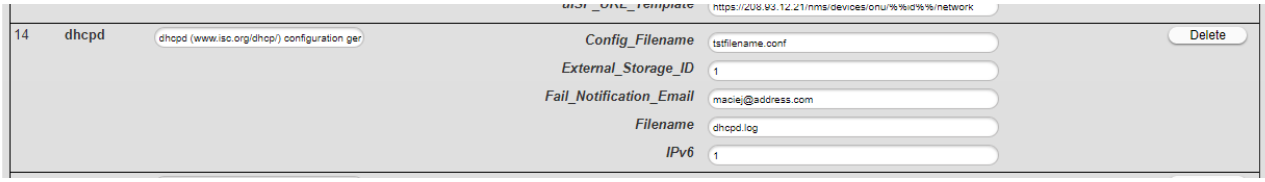


Fig. 17.2.2.1 Example Vetro API configuration entry

Optional Settings:

Listed below, is a set of additional global attributes that can be defined for the API module:

- ***Fail_Notification_Email*** – email address where emails notifying about API communication failures will be sent. Notification emails are only sent if this option is defined otherwise no emails will be sent.
- ***Filename*** – name for a SIMPLer's server local log file to store base operation details performed through the interface.

The ISC DHCPD integration requires the following triggers to be enabled as a part of the configuration process (Fig. 17.2.2.2):

- ***Update WIB Files*** – enabling this trigger is required to enable the integration

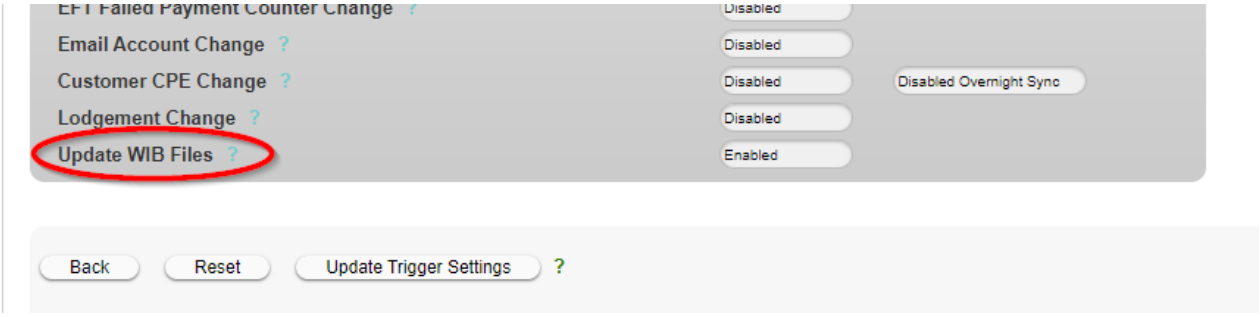


Fig. 17.2.2.2 Update WIB Files option enabled

17.2.3 Deploy auto-reload script on the dhcpd server

ISC DHCPD service will NOT reload it's configuration from a file automatically upon the file being updated. Measeures need to be deployed to ensure that the service will be reloaded / restarted. Azotel recommends setting up a cron job on the server hosting dhcpd with a script similar to the one listed below:

```
#!/bin/sh
mkdir /azotel 2>/dev/null


# IPv4 check
CONFIG_FILE="/etc/dhcp/dhcpd.conf"
CONFIG_FILE_OLD="/azotel/dhcp.conf.0"
CONFIG_FILE_DIFF="/azotel/dhcp.conf.diff"

# Create the old file on the 1st run
```

```
touch $CONFIG_FILE_OLD

# Run a diff between the two configuration files, and restart upon detecting
differences
diff $CONFIG_FILE $CONFIG_FILE_OLD > $CONFIG_FILE_DIFF 2> /dev/null

[ $? != 0 ] && {
 echo "Restarting DHCP server"
 service dhcpd restart
}


# IPv6 check
CONFIG_FILE6="/etc/dhcp/dhcpd6.conf"
CONFIG_FILE6_OLD="/azotel/dhcp6.conf.0"
CONFIG_FILE6_DIFF="/azotel/dhcp6.conf.diff"

# Create the old file on the 1st run
touch $CONFIG_FILE6_OLD

# Run a diff between the two configuration files, and restart upon detecting
differences
diff $CONFIG_FILE6 $CONFIG_FILE6_OLD > $CONFIG_FILE6_DIFF 2> /dev/null

[ $? != 0 ] && {
 echo "Restarting DHCP server"
 service dhcpd restart
}


# To improve server's robustness - try to reload radius if radius process is not
running already
sleep 10
PROCESS_NUM=`ps -ef | grep "dhcpd" | grep -v "grep" | wc -l`
if [ $PROCESS_NUM -eq 1 ];
then
 echo "DHCP Server is running."
else
 echo "DHCP Server is not running. Attempting to start DHCP server"
 service dhcpd start
fi

# Make a copy of the current configuration file
cp -f $CONFIG_FILE  $CONFIG_FILE_OLD  2> /dev/null
cp -f $CONFIG_FILE6 $CONFIG_FILE6_OLD 2> /dev/null
```

Save the above script on the DHCP server drive and than put the below line to your crontab:

```
/5 * * * *   root PATHTOYOURDHCPRELOADFILE
```

17.2.4 Gateway Custom DHCP Config

There are two fields in the Modify Gateway Details page (Network -> Gateway Details -> <wib number>) called ***"Custom DHCP Config"*** & ***"Custom DHCP IPv6 Config".***

Note: One or both fields need to be filled out (depending on whether we generate IPv4, IPv6 or both DHCPD configuration files). Leaving them blank will disable the integration.

Once text is put in this field, the text is used as the dhcpd service config file base to which only “host” directives section will be automatically added based on customer equipment / basestation equipment that is set in SIMPLer.

The little red down arrows to the right of the boxes will cause the current config to be downloaded to the browser, so you can verify that it looks OK. Exact same file will be pushed to the dhcpd server upon “Update WIB Files” action being executed.

Fig. 17.2.4.1 Gateway Custom DHCP Config

SIMPLer will generate the "host" directives - these are the commands which associate the MAC address to the IP address. For example:

```
host TEST31_test {
    hardware ethernet 22:33:44:55:66:66;
    fixed-address 172.16.9.202;
}
```

In order to indicate where in the config file these hosts directives should go, you can use the %HOSTS% token in the Custom DHCP config field. SIMPLer will expand out the %HOSTS% token with the auto-generated host directives before sending the file to the WIB (if the %HOSTS% token is omitted, the host directives will be added to the end of the file).

So, for example if the Custom DHCP config field had

```
authoritative;
always-broadcast on;

%HOSTS%

shared-network wib {
  subnet 10.11.1.0 netmask 255.255.255.0 {
```

then the resulting dhcpd.conf file would look like this

```
authoritative;
always-broadcast on;

host TEST31_test
    hardware ethernet 22:33:44:55:66:66;
    fixed-address 172.16.9.202;
}
[...more host directives...]

shared-network wib {
  subnet 10.11.1.0 netmask 255.255.255.0 {
```

SIMPLer will always supply the "hardware ethernet" and "fixed-address" parameters in the host directive for each IP address. If the operator wants to include more customer, or IP, specific DHCP options, then these can be added to the customer details network page:

17.3 Host directive sources

Host directive in the configuration files created by this integration will be generated from following three sources:

- ***Customer IP table*** – host directives will be generated for IP Address entries where both IP address and MAC address are provided

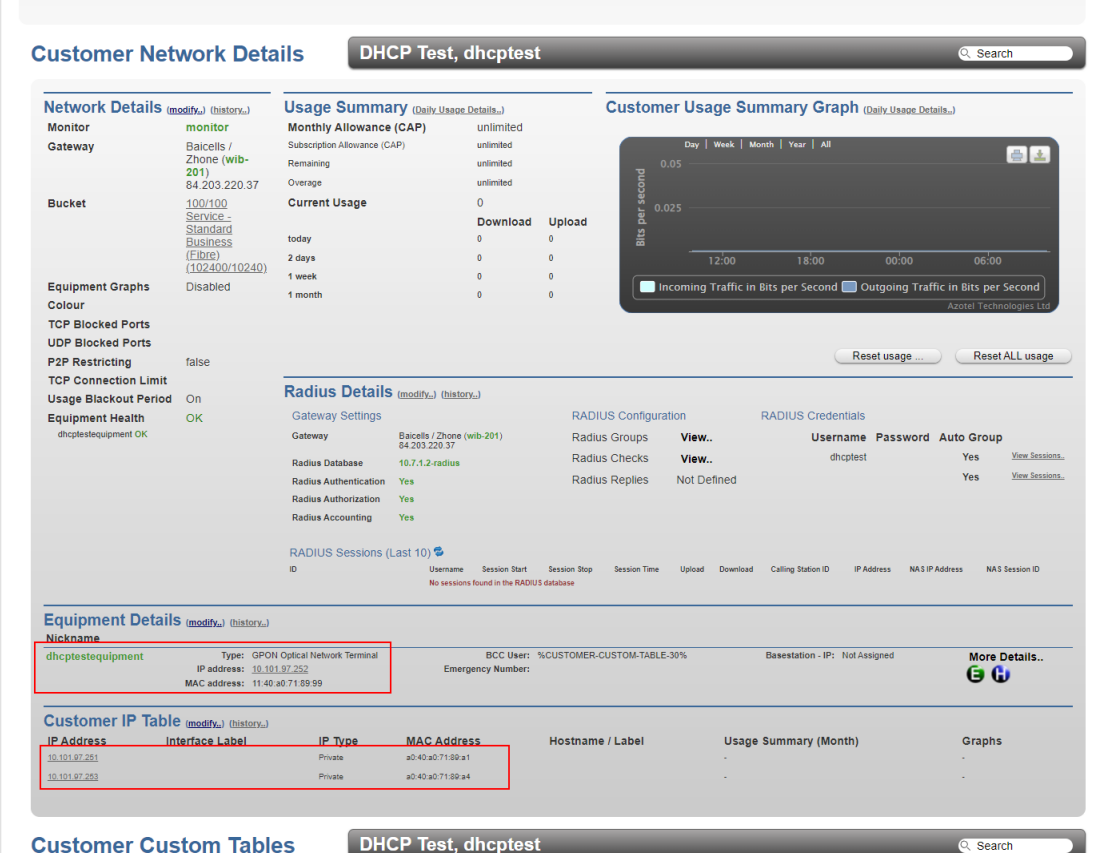


Fig. 17.3.1 Customer details page

- ***Customer Equipment*** – host directives will be generated for Equipment where both IP address and MAC address are provided
- ***Basestations*** – host directives will be generated for Basestations where both IP address and MAC address are provided for corresponding equipment

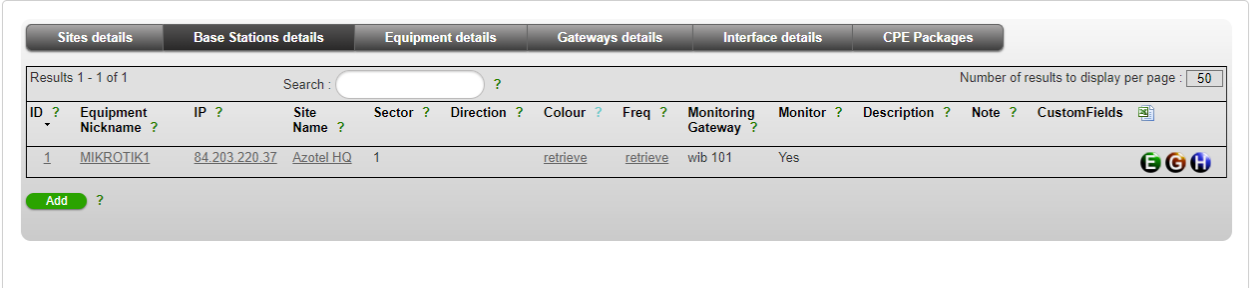


Fig. 17.3.2

Annex A: References

A.1 Document References

TBD

A.2 Link References

[L1] http://www.azotel.com/
Azotel homepage.

[L2] http://www.telrad.com/
Telrad homepage.

Annex B: Generic Procedures

B.1 Import Sim Cards / LTE CPE equipment from CSV files

SIM Cards and LTE gear, as well as any other piece of equipment, can be imported to the SIMPLer platform from CSV files using the ***'Import Data'*** tool. Use of the import tools has been well described under below entry of Azotel WiKi pages:

http://wiki.azotel.com/simpler-features/features-index-1/import-interface

For the benefit of this manual below please find the steps that outline the import process:

- ***Step One***: Click on the 'Import Data' button from the 'Settings' menu in SIMPLer. (See Fig. 8.4-1).

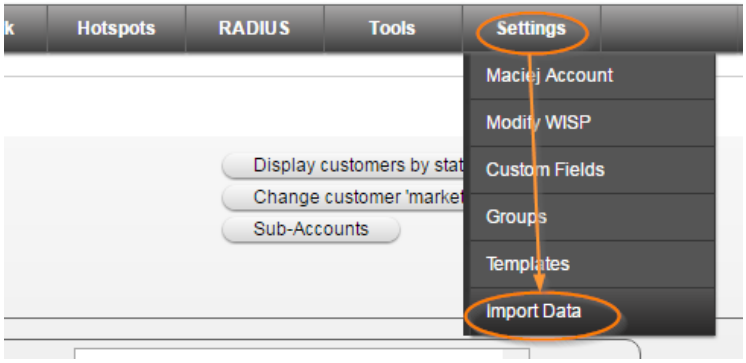


Fig. B.1.1-1: Settings – Import Data

- ***Step Two:*** Pick the 'Equipment' option from the 'Table to be populated' dropdown menu. Submit your choice with the 'Load Interface' button. (See Fig. 8.4-2) This will bring up an interface dedicated to uploading Equipment positions to the SIMPLer platform.

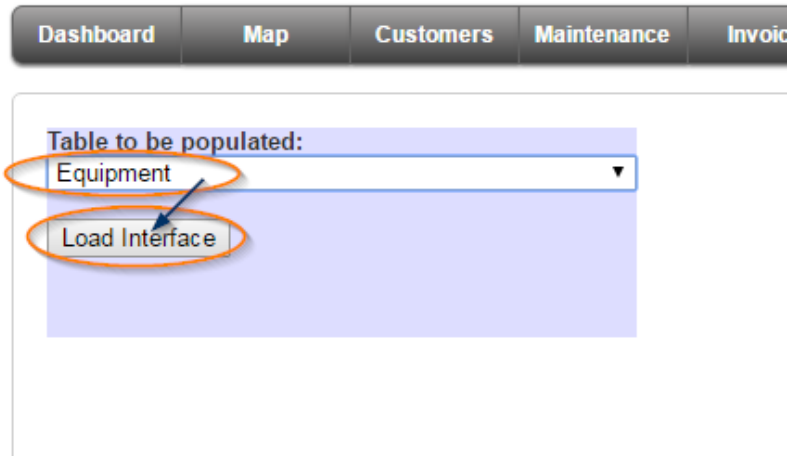


Fig. B.1.1-2: Import Data – Equipment

- ***Step Three:*** Prepare the CSV file for upload. For SIM Cards used in the BaiCells environment it should at least contain the following six columns:
  - **Nickname** – Unique equipment nickname – SIMPLer will not allow duplicates in this field. This must be in the first column of the imported file.
  - **IMSI** – International Mobile Subscriber Identity.
  - **KI** – Key (K) required for authentication.
  - **OPCODE** – Opc required for authentication.
  - **Type** – it should be set to 'SIM Card'.

- **Status** – It should be set to "stock" if you will need to re-assign these pieces of equipment to customers at a later date.

Nickname	IMSI	ICCID	PIN1	PUK1	ADM1	PIN2	K	OPc
SIMCARD1	001001000001941	8997201010000020841	1111	11111111	A519C1B6E3BBB4CA	2222	0D190F9F15714A536C121BDD95F5431C	63F62FB7C65A812A357F7A0C31
SIMCARD2	001001000001942	8997201010000020842	1111	11111111	00E0D655A3A9ECD8	2222	BCF7661339E4850A455415FD7C5B33E1	5D045BD94B63EF9D86CC675AD3
SIMCARD3	001001000001943	8997201010000020843	1111	11111111	29E0EA92E1774A9D	2222	93936CF4E482006F3BC1E6B755E381BA	385D52D673529383014204 36ECC
SIMCARD4	001001000001944	8997201010000020844	1111	11111111	2420E27CC918259C	2222	7A80BAAB9A29767D7058F73D71BCCBED	1C476A1EE8F2C287865EA03989E
SIMCARD5	001001000001945	8997201010000020845	1111	11111111	BCE4E88A047A54FC	2222	FB86D23094EECBDBD6CF83F371B1FC9C	C05097C1971A14B487CE88CBBD

Fig. B.1.1-3: Example import Spreadsheet for SimCards

An example CSV file format can be found on the below screenshot (Fig. 8.4-4). To summarise, it must be comma separated with " used as a string delimiter.

```
"SIMCARD1","001001000001941","8997201010000020841","1111","11111111","A519C1B6E3BBB4CA","2222","0D190F9F15714A536C121BDD95F5431C","63F62FB7C65A812A357F7A0C311620F5","SIM Card"
"SIMCARD2","001001000001942","8997201010000020842","1111","11111111","00E0D655A3A9ECD8","2222","BCF7661339E4850A455415FD7C5B33E1","5D045BD94B63EF9D86CC675AD368E05E","SIM Card"
"SIMCARD3","001001000001943","8997201010000020843","1111","11111111","29E0EA92E1774A9D","2222","93936CF4E482006F3BC1E6B755E381BA","385D52D673529383014204 36ECCED361","SIM Card"
"SIMCARD4","001001000001944","8997201010000020844","1111","11111111","2420E27CC918259C","2222","7A80BAAB9A29767D7058F73D71BCCBED","1C476A1EE8F2C287865EA03989EC04AF","SIM Card"
"SIMCARD5","001001000001945","8997201010000020845","1111","11111111","BCE4E88A047A54FC","2222","FB86D23094EECBDBD6CF83F371B1FC9C","C05097C1971A14B487CE88CBBDB2998D","SIM Card"
```

Fig. B.1.1-4: Example CSV

- ***Step Four:*** Once the CSV file is prepared, columns reflecting the file format should be chosen by double clicking the field name in the left-hand column, you will transfer it to the right-hand column, which represents the fields that will be imported, and then select the file to upload and finally click on the 'Upload File' button to start importing process. (See Fig. 8.4-5).

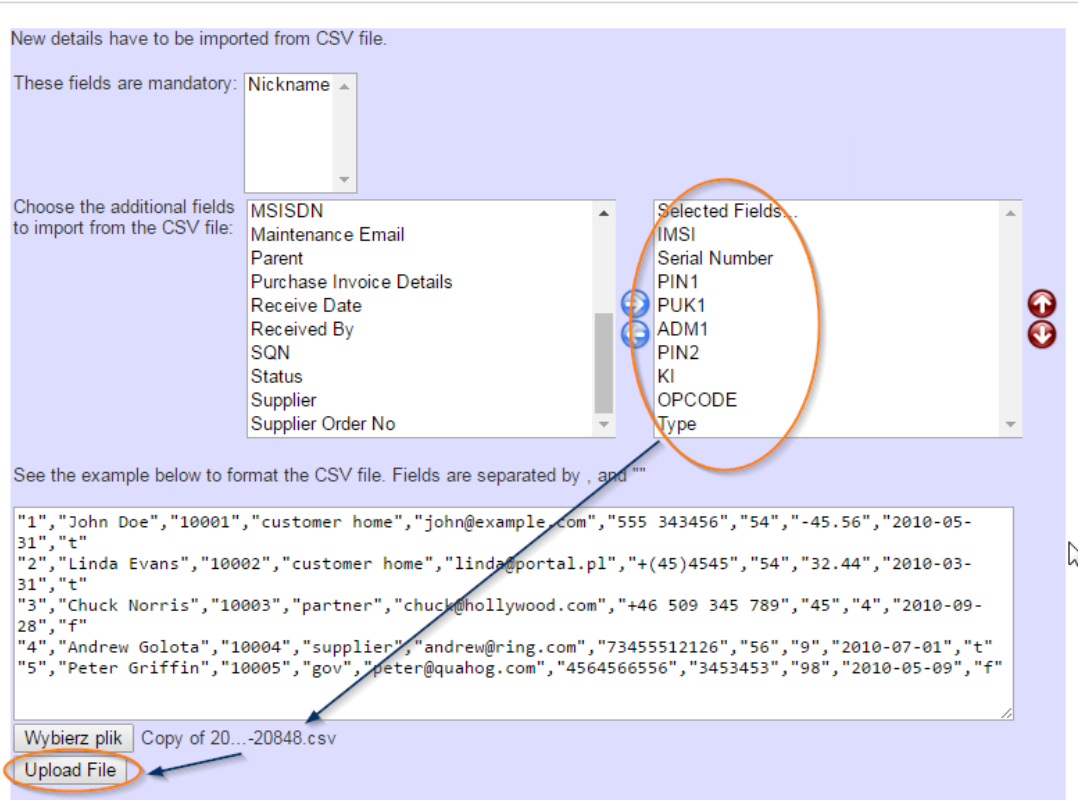


Fig. B.1.1-5: Upload File Process

- ***Step Five:*** This will bring a page where data from the uploaded file is interpreted. Any errors will be highlighted and must be corrected before SIMPLer will allow the data set to be imported. Click the 'IMPORT' button once the data set has been reviewed. (See Fig. 8.4-6).

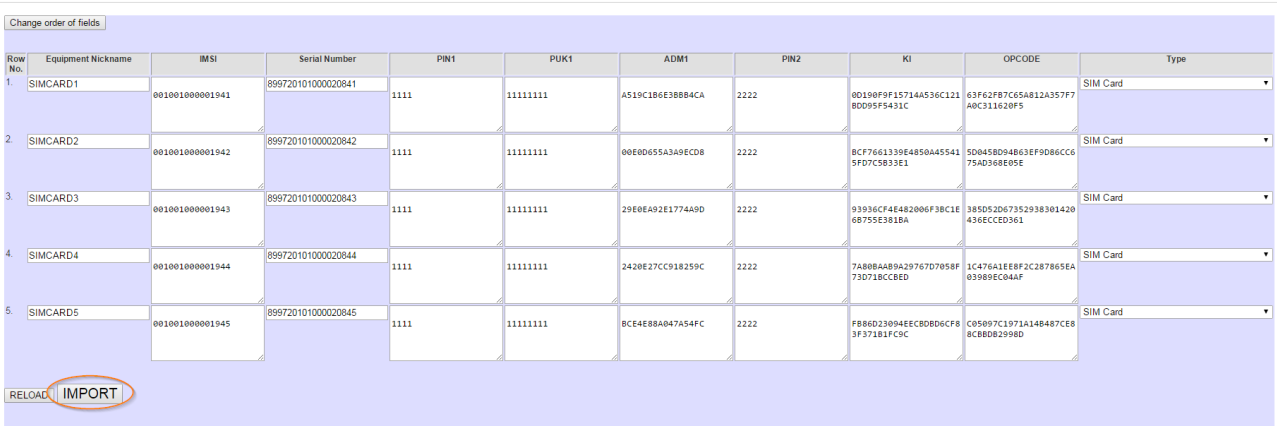


Fig. B.1.1-6: File Review and Import

B.2 Add Sim Cards / LTE CPE Manually

SIM Cards, LTE CPE as well as any other equipment can also be added to the SIMPLer platform manually. Following below steps to add a Sim Card to SIMPLer platform – note that pretty much same steps apply to LTE CPE:

- ***Step One***: Click on ***'Equipment Details'*** from the ***'Network'*** submenu to navigate the equipment page that lists all equipment available in the operator instance. There click on the ***'Add'*** button. Alternatively you can directly click on the ***'Add New Equipment'*** option from the ***'Network'*** submenu. (See Fig. 8.5-1).

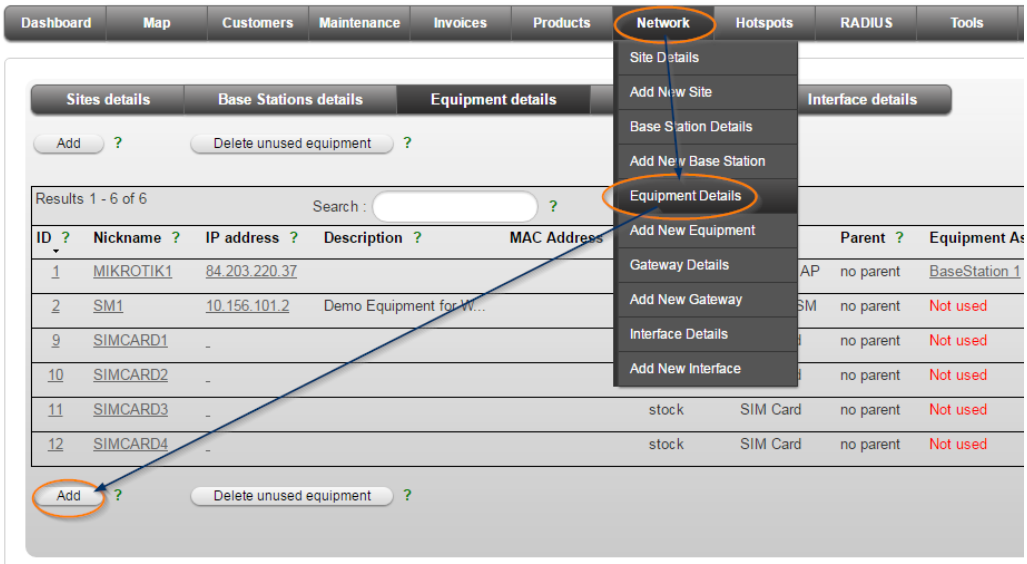


Fig. B.2.1-1: File Review and Import

- ***Step Two:*** Fill out the new SIM Card details. Make sure to use ***'SIM Card'*** as the ***'Type'***. This will enable additional, sim card related details section where the IMSI, KI, and OPCODE can be filled out. The type should also be set as ***"stock"*** because this will make it available for selection once you are ready to assign it to a customer. Once done editing simcard attributes click on the ***'Add'*** button. (See Fig. 8.5-2).

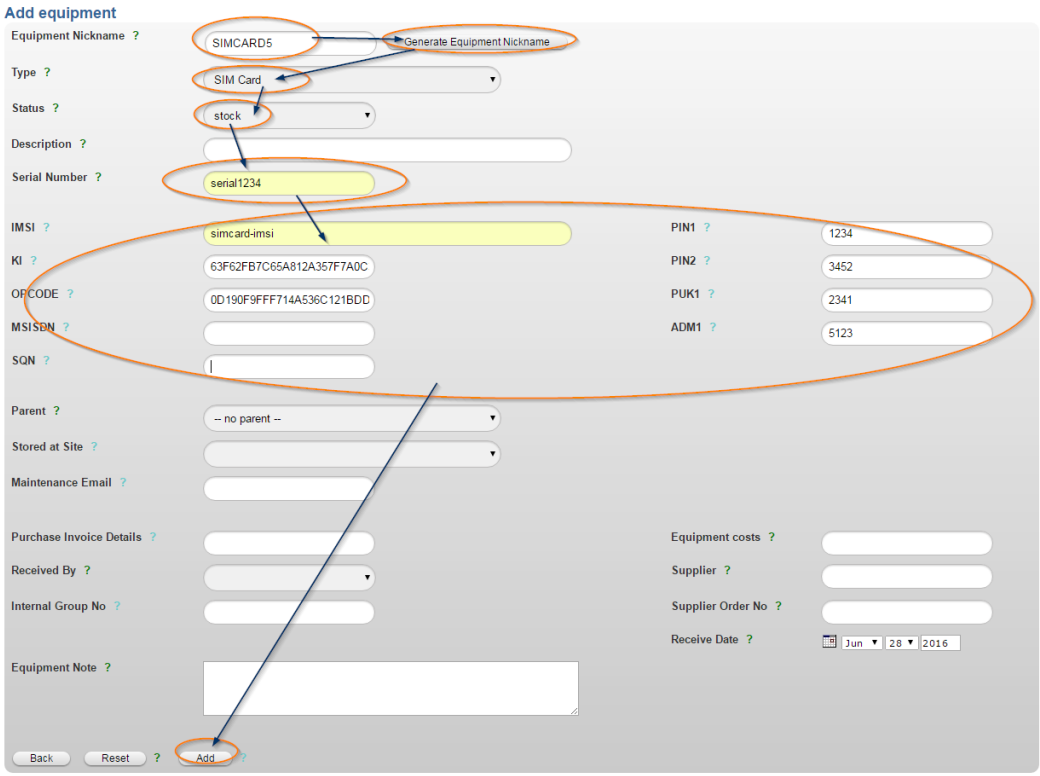


Fig. B.2.1-2: Add Sim Card

Annex C: Change history

Change history				
Date	**Author**	**Subject/Comment**	**Old**	**New**
05/07/2016	emma	Original	N/a	001
24/08/2016	emma	Reviewed	001	002
13/09/2016	oharej	Reviewed	002	003
05/10/2016	emma	Reviewed	003	004
05/06/2017	gawl	Extenet EPC	004	005
16/06/2017	emma	Small Corrections to Extenet Documentation	005	006
	emma	Baicells documentation added by Maciej – date unknown	006	007
15/11/2017	emma	Corrected table of contents to include Baicells	007	008
06/06/2019	gawl	Dashan Zhone ZMS	008	009
28/10/2019	gawl	Calix	009	010
01/11/2019	heather	Reviewed	010	011
18/05/2020	gawl	Felix	011	012
04/03/2021	heather	Dashan Zhone ZMS – 10.3.4 Voice provisioning – Customer Account setup	012	013
18/06/2021	heather	Reviewed. 13 Alianza API integration	013	014
26/01/2022	gawl	Plume	014	015
22/04/2022	gawl	Ericsson TDD LTE + Vetro	015	016
05/05/2022	heather	Reviewed	016	017