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# **AP Analytica**

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## **Access Point Analytics User Manual**

**Version 1.2**

AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

## Revision History

Date	Version	Description	Author
04/18/2020	1.0	Creation/Organization and Sections 1,2,4,6	Ryan Finnegan
4/22/2020	1.1	Section 3, 5	Ryan Finnegan
4/22/2020	1.2	Reviewing and Edits	Bradley Schoeneweis

## Table of Contents

1.	Introduction	3
	1.1 Purpose	3
	1.2 Project Overview	3
	1.3 References	3
2.	Login and User Info	4
	2.1 Login	4
	2.2 Navigating to User Settings	4
	2.3 Change Password	5
	2.4 Logout	5
3.	KPI Dashboard	6
	3.1 Pick a KPI	6
	3.2 Select KPI Settings and Sorting	7
	3.4 Toggle Graphs	7
	3.5 Graph Options	8
	3.6 Details of an AP	8
	3.7 Return Home	8
4.	KPI Pages	9
	4.1 Navigating to Page	9
	4.2 Sorting	9
	4.3 KPI Settings	10
	4.4 Search a Table	10
	4.5 Paging	11
	4.6 Ignore an AP	11
5.	Anomaly Detection	12
	5.1 Training	12
6.	User Management	13
	6.1 Add a User	13
	6.2 Delete a User	13

AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

## 1. Introduction

### 1.1 Purpose

The purpose of the User's Manual is to provide an applicable and comprehensive guide for using the Access Point Analytics Web Application. This manual will cover everything that a User should know in order to use the software through pictures and easily read instructions. If you are looking for a specific section then check the Table of Contents above.

### 1.2 Project Overview

The goal of this project is to give employees of the TCU Network Services department more information about the wireless access points across TCU campus. Access point data generated from CISCO Prime is fed into our web application which converts the mass information into an updated feed that the user is able to see in table and graph views. The data is categorized into 7 different KPIs (Key Performance Indicators) each having their own page and data stored, sortable, and searchable. The hope of this project is that with this easier view of the data it becomes easier for TCU Network Services to identify problems on our wireless network to further improve TCU's campus.

### 1.3 References

*See Glossary provided as a separate document for all project definitions.*

*Glossary:*

<https://drive.google.com/open?id=1Gei7OouYNgt6AkryCEMw2jo0FsC0MPde>

*Software Development Plan:*

<https://drive.google.com/open?id=10chPZWY3lDF43PLXKTzdjzwnCVyEJI-F>

*System Architecture:*

<https://drive.google.com/open?id=1dp36CUzih3lYImoflS4aTsPCO5-LX1lz>

*Vision Document:*

[https://drive.google.com/open?id=1IEw6DaiEjMlJYm6in\\_E0cW4Gy08cx7q](https://drive.google.com/open?id=1IEw6DaiEjMlJYm6in_E0cW4Gy08cx7q)

AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

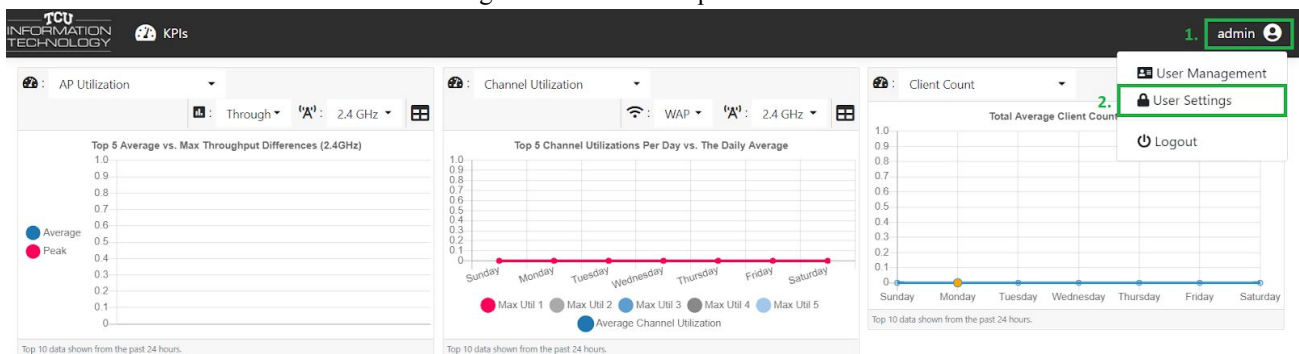
## 2. Login and User Info

### 2.1 Login

1. Enter your user information given to you by an admin in the Username and Password box then hit Login.

### 2.2 Navigating to User Settings

1. At the top right of the dashboard left click your username to open the menu.
2. Select User Management from the dropdown box.





AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020


### 2.3 Change Password

This page lets you change your password by entering your previous password then your next password you wish to have and confirming that with the Submit button.

# Change Password

Current Password 

New Password 


Confirm New Password 

### 2.4 Logout


Once you are done with using AP Analytics you can sign out of your account by:


1. Select your username in the top right
2. Select the Logout button.

TCU INFORMATION TECHNOLOGY
KPIs

1. admin 

## Change Password

Current Password 

2. Logout 

### 3. KPI Dashboard

#### 3.1 Pick a KPI

From the dashboard each card is able to be customized to specific KPIs as the user sees fit. By pressing the dropdown and selecting a KPI from the list you are able to see each of the different KPI's.

The screenshot shows the TCU Information Technology KPIs dashboard. At the top, there is a header with the TCU logo and the text 'INFORMATION TECHNOLOGY' and 'KPIs'. Below the header, there is a card titled 'AP Utilization' with a dropdown menu labeled 'Select a KPI'. To the right of the card, there is a frequency selector set to '2.4 GHz' and a refresh icon. The main content of the card is a table with the following columns: AP Name, Avg Clients, Peak Throughput, Peak RSSI, and Peak SNR. The table contains 10 rows of data, representing the top 10 APs shown from the past 24 hours.

AP Name	Avg Clients	Peak Throughput	Peak RSSI	Peak SNR
MMA1WAC-HL-106	9.66	22.8	-54	90
LUP2WAC-RM-205	8.01	0.11	-36	61
PAL2WAD-RM-226	7.22	4.29	-31	65
SHE3WAI-RM-312	5.9	0.12	-46	42
MON4WAC-RM-416	5.75	2.51	-29	61
SWR4WAH-RM-420	4.56	0.31	-48	40
LIB3WAF-HL-3141	4.05	0.02	-50	43
MUL2WAA-RM-210	3.98	0	-55	39
LIB2WAI-RM-2230	3.81	1.08	-33	55
CLA3WAB-RM-312	3.73	0	-54	36

Top 10 data shown from the past 24 hours.

### 3.2 Select KPI Settings and Sorting

The different settings for each KPI will appear to the right of the KPI selector. In the example in green you are able to change Bands from 2.4 or 5.0 Ghz. In the orange we are able to click each of the column headers to sort the table on by numeric or alphabetically.

AP Name	Channel Util	RX Util	TX Util
FA21WAZ-OUT-North	83.1818	0.0000	0.0909
KIN1WAZ-OUT-North	69.4286	0.0260	4.9870
REC1WAY-OUT-North	65.7368	0.0000	6.6711
SHE1WAZ-OUT-South	62.4247	0.0000	5.2877
AVO1WAW	61.8831	0.0000	0.0000
FOS1WAZ-OUT-North	61.2466	0.0000	2.5616
AVO1WAV	59.7403	0.0000	0.0000
AVO1WAZ	58.7792	0.0000	0.0000
GMS6WAQ-RM-613	57.6364	0.0130	0.3896
CLA1WAZ-OUT-West	56.7143	0.0000	6.9481

Top 10 data shown from the past 24 hours.

### 3.3 Toggle Graphs

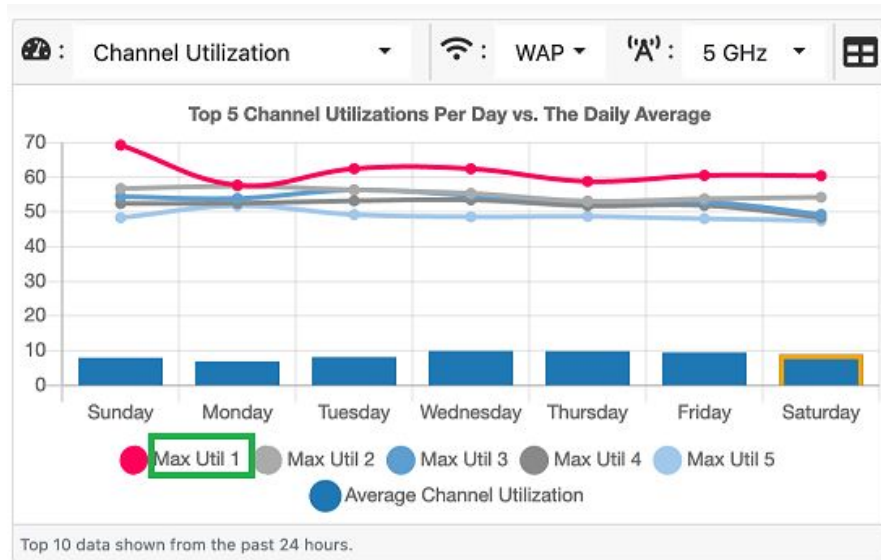
To toggle graph view for a KPI press the Pie Chart Icon in the top right of the KPI card as shown in the example in green below. This will bring up a graph of the KPI. To go back to table view press the Table icon button in the same spot!

AP Name	Avg Clients	Peak Throughput	Peak RSSI	Peak SNR
MMA1WAC-HL-106	9.66	22.8	-54	90
LUP2WAC-RM-205	8.01	0.11	-36	61
PAL2WAD-RM-226	7.22	4.29	-31	65
SHE3WAI-RM-312	5.9	0.12	-46	42
MON4WAC-RM-416	5.75	2.51	-29	61
SWR4WAH-RM-420	4.56	0.31	-48	40
LIB3WAF-HL-3141	4.05	0.02	-50	43
MUL2WAA-RM-210	3.98	0	-55	39
LIB2WAI-RM-2230	3.81	1.08	-33	55
CLA3WAB-RM-312	3.73	0	-54	36

Top 10 data shown from the past 24 hours.

### 3.4 Graph Options

Most of the KPI graphs allow the user to disable or enable information by clicking on the text of the graphs Key or Legend. For instance when you click on Max Util 1 in the example below in green. The red line will no longer show on the graph.



### 3.5 Details of an AP

On the Rogue AP KPI you are able to select specific MAC addresses and attain more information about each of them in their details page. If you see blue text then you can click that hyperlink to bring you to that MAC addresses info page.

Reason	MAC Address	Location	State	Time
Loud SSID	<a href="#">c2:d2:f3:5e:1d:be</a>	GrandMarc South 4th	Alert	03:43 PM
Loud SSID	<a href="#">1e:5c:25:a7:bd:3f</a>	Sadler 3rd Floor	Alert	02:15 PM
Loud SSID	<a href="#">f2:6e:0b:c3:b6:d4</a>	Rees-Jones 2nd Floor	Alert	01:22 PM
Loud SSID	<a href="#">be:70:85:64:a8:c4</a>	GrandMarc South 6th Floor	Alert	12:29 PM
Loud SSID	<a href="#">38:9d:92:36:2a:69</a>	GrandMarc North 5th Floor	Alert	12:28 PM
Loud SSID	<a href="#">22:ad:56:31:67:30</a>	Jane Justin Soccer 1st Floor	Alert	12:15 PM
Loud SSID	<a href="#">f8:2d:c0:59:90:70</a>	Pond Street Data Center 1st Flr	Alert	09:05 AM
Loud SSID	<a href="#">be:88:73:16:3c:fd</a>	Milton Daniel Hall 2nd Floor	Alert	06:09 AM
Loud SSID	<a href="#">8a:9f:29:bc:25:f6</a>	Richards 3rd Floor	Alert	05:21 AM
Loud SSID	<a href="#">00:0e:8e:5f:a3:ce</a>	Library 2nd Floor	Alert	03:39 AM

Top 10 data shown from the past 24 hours.

### 3.6 Return Home

To return to the dashboard click the “TCU Information Technology” Icon in the top left of the window.

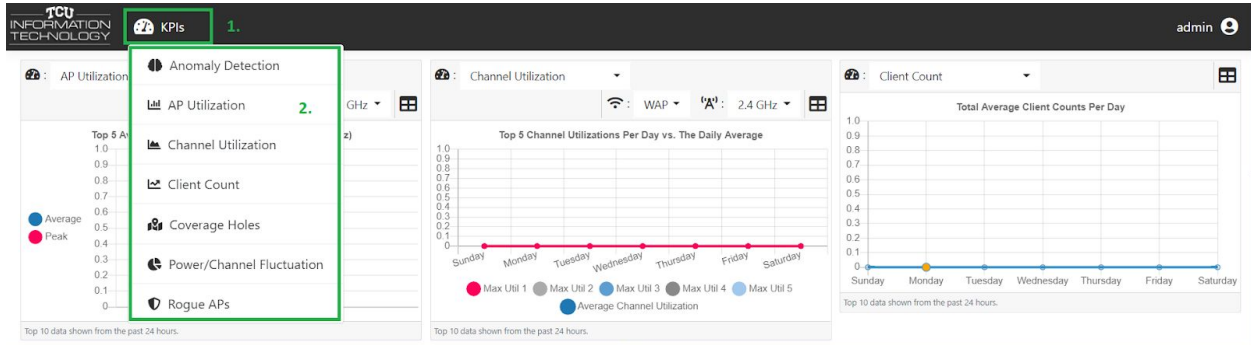


## 4. KPI Pages


### 4.1 Navigating to Page

To get more info than the dashboard about an individual KPI then:

1. Navigate to the KPI Button in the top left.
2. Select a KPI from the List. In this example we will look at AP Utilization.



### 4.2 Sorting

Each KPI table is already default sorted to a specific row, but users are also able to sort on their own by clicking on the column headers with the  icon.

Click Any Header to Sort!

AP Name	Radio Type	Avg Clients	Peak Throughput	Avg Throughput	Peak RSSI	Avg RSSI	Peak SNR	Avg SNR	Ignore
SB11WAZ-OUT-East	802.11b/g/n	10.37	0	0.0000	-72	-72.5920	44	13.3600	
LIB3WAN-HL-3152	802.11b/g/n	8.16	0.01	0.0000	-56	-52.1250	46	36.6250	
LBA1WAD-RM-155	XOR (2.4GHz)	6.36	0	0.0000	-63	-64.8750	36	27.7500	
SA13WAG-RM-324	XOR (2.4GHz)	4.69	0.97	0.0825	-59	-56.9900	45	36.8175	
LANBWAB-RM-007	XOR (2.4GHz)	4.24	0.28	0.0100	-44	-48.1300	52	41.1767	
FA22WAF-RM-200	XOR (2.4GHz)	4.19	0	0.0000	-36	-46.6700	48	16.0000	
LAN1WAD-RM-122	XOR (2.4GHz)	4.18	0	0.0000	-44	-54.7500	48	35.2500	
WAI3WAG-HL-328	XOR (2.4GHz)	4.16	3.95	0.1725	-46	-54.1400	55	29.2450	
GMS4WAF-RM-433	XOR (2.4GHz)	4.11	0	0.0000	-57	-66.0000	38	28.6700	
HAY4WAC-RM-425	802.11b/g/n	4.03	0.42	0.0300	-46	-52.3850	64	40.3875	

### 4.3 KPI Settings

There are different settings for each KPI. In our example of the AP Utilization KPI the user is able to sort by Time as well as the choice between the Bands of 2.4Ghz and 5Ghz.

In this example we change our Settings options to entries in the “Past Month” and “5.0 Ghz”

⌚: Past Month    'A': 5 GHz

	Type	Avg Clients	Peak Throughput
SB11WAZ-OUT-East	802.11a/n	10.37	0.05
LANBWAB-RM-007	802.11a/n/ac	8.16	4.52
LANBWAB-RM-133	802.11a/n/ac	6.36	0.62
SA13WAG-RM-324	802.11a/n/ac	4.69	16.81
LANBWAB-RM-007	802.11a/n/ac	4.24	14.43
FA22WAF-RM-200	802.11a/n/ac	4.19	27.24
LAN1WAD-RM-122	802.11a/n/ac	4.18	2.58
WAI3WAG-HL-328	802.11a/n/ac	4.16	14.5
GMS4WAF-RM-433	802.11a/n/ac	4.11	11.45
HAY4WAC-RM-425	802.11a/n/ac	4.03	10.35

#### 4.4 Search a Table

If you want to search for a specific AP Name that may be causing problems then type in that specific AP Name in the search field on the top right of each KPI table and the table will only show entries of that search. An example of searching for the AP Name of “SB11WAZ-OUT-East” is shown below.

⌚: Past Month    'A': 5 GHz    🔍 SB11WAZ-OUT-East

AP Name	Radio Type	Avg Clients	Peak Throughput	Avg Throughput	Peak RSSI	Avg RSSI	Peak SNR	Avg SNR	Ignore
SB11WAZ-OUT-East	802.11a/n	10.37	0.05	0.0000	-44	-70.7575	53	15.1375	🚫

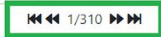
⏪ 1/1 ⏩

AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

#### 4.5 Paging

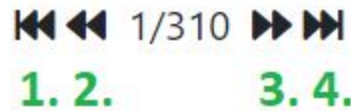
Paging allows the table to display a certain number of entries at a time. If you wish to see past the default limit of each KPI then press the buttons at the bottom of the table.

AP Name	Radio Type	Avg Clients	Peak Throughput	Avg Throughput	Peak RSSI	Avg RSSI	Peak SNR	Avg SNR	Ignore
SB11WAZ-OUT-East	802.11a/n	10.37	0.05	0.0000	-44	-70.7575	53	15.1375	👁
LIB3WAN-HL-3152	802.11a/n/ac	8.16	4.52	0.1633	-42	-52.8733	52	37.3867	👁
LBA1WAD-RM-155	802.11a/n/ac	6.36	0.62	0.0400	-75	-60.5700	62	25.6700	👁
SA13WAG-RM-324	802.11a/n/ac	4.69	16.81	0.5875	-42	-58.0250	53	31.1200	👁
LANBWAB-RM-007	802.11a/n/ac	4.24	14.43	0.1075	-50	-55.1000	59	33.0800	👁
FA22WAF-RM-200	802.11a/n/ac	4.19	27.24	0.1775	-34	-44.1775	61	39.1125	👁
LAN1WAD-RM-122	802.11a/n/ac	4.18	2.58	0.1375	-58	-63.1975	49	20.0725	👁
WAI3WAG-HL-328	802.11a/n/ac	4.16	14.5	0.4125	-42	-56.9550	54	31.0350	👁
GMS4WAF-RM-433	802.11a/n/ac	4.11	11.45	0.2625	-39	-54.0750	90	37.0300	👁
HAY4WAC-RM-425	802.11a/n/ac	4.03	10.35	0.3925	-38	-56.2000	61	34.6550	👁



To get a better understanding of the paging options:

1. Go to the first page
2. Go back one page
3. Move forward one page
4. Go to the last page



#### 4.6 Ignore an AP

On KPI's: Coverage Holes and AP Utilization the user is able to add Ignored Access Points to a separate table in order to remove some extraneous outliers from the table. You can do this by:

1. Pressing the slashed Eye in the last column of the table on the AP you wish to ignore

AP Name	Radio Type	Avg Clients	Peak Throughput	Avg Throughput	Peak RSSI	Avg RSSI	Peak SNR	Avg SNR	Ignore
SB11WAZ-OUT-East	802.11a/n	10.37	0.05	0.0000	-44	-70.7575	53	15.1375	👁
LIB3WAN-HL-3152	802.11a/n/ac	8.16	4.52	0.1633	-42	-52.8733	52	37.3867	👁
LBA1WAD-RM-155	802.11a/n/ac	6.36	0.62	0.0400	-75	-60.5700	62	25.6700	👁
SA13WAG-RM-324	802.11a/n/ac	4.69	16.81	0.5875	-42	-58.0250	53	31.1200	👁
LANBWAB-RM-007	802.11a/n/ac	4.24	14.43	0.1075	-50	-55.1000	59	33.0800	👁
FA22WAF-RM-200	802.11a/n/ac	4.19	27.24	0.1775	-34	-44.1775	61	39.1125	👁
LAN1WAD-RM-122	802.11a/n/ac	4.18	2.58	0.1375	-58	-63.1975	49	20.0725	👁
WAI3WAG-HL-328	802.11a/n/ac	4.16	14.5	0.4125	-42	-56.9550	54	31.0350	👁
GMS4WAF-RM-433	802.11a/n/ac	4.11	11.45	0.2625	-39	-54.0750	90	37.0300	👁
HAY4WAC-RM-425	802.11a/n/ac	4.03	10.35	0.3925	-38	-56.2000	61	34.6550	👁

1. Scroll down to the bottom of the page to see the Ignored AP.
2. Remove the AP from the ignore table by pressing the Eye in the right column.

AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

## Ignored AP Utilization AP's

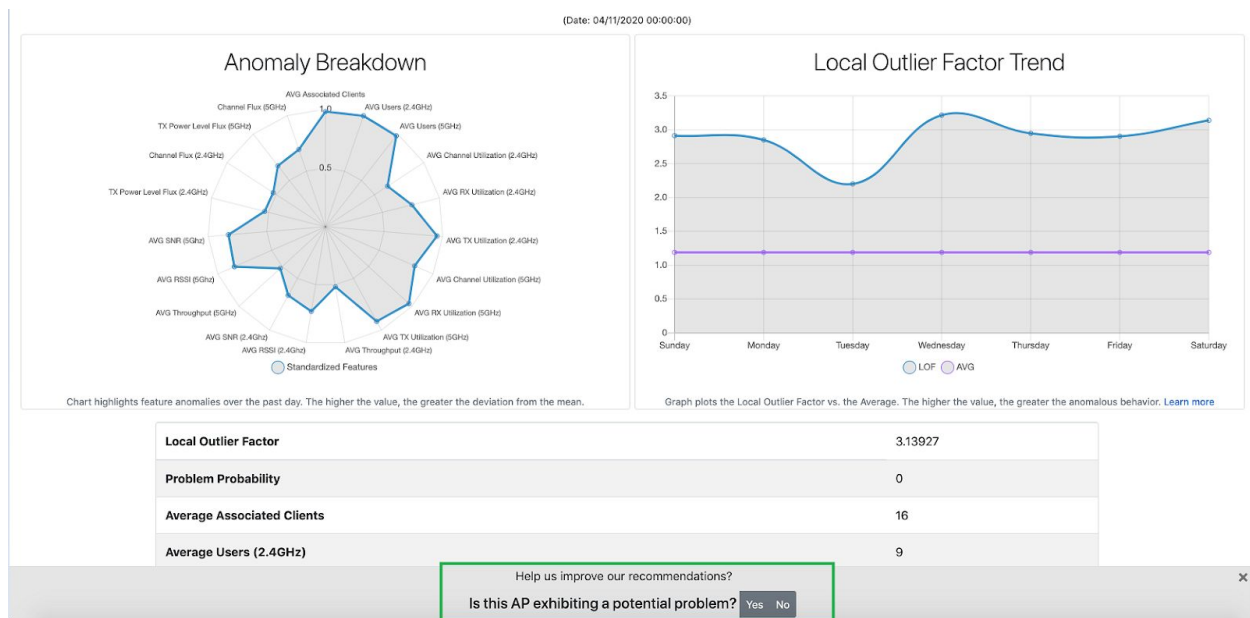
AP Name	Map Location	Ignore
LAN1WAD-RM-122	System Campus > Ed Landreth > Ed Landreth 1st Floor	<input checked="" type="checkbox"/>

Note: Rogue AP's have similar functionality, but no Ignore Rogue AP table. There is a button to hide and show individual Rogue AP's.

### 5. Anomaly Detection

#### 5.1 Training

Anomaly Detection allows the users to help train the machine learning algorithm to determine if indeed the AP was exhibiting abnormal behavior. When going to the Anomaly Detection KPI page the user may click on a specific AP to get more knowledge about that AP and at the bottom of the screen the user can determine if this AP is exhibiting a problem by choosing "Yes" or "No". This helps determine future anomalies in the system!



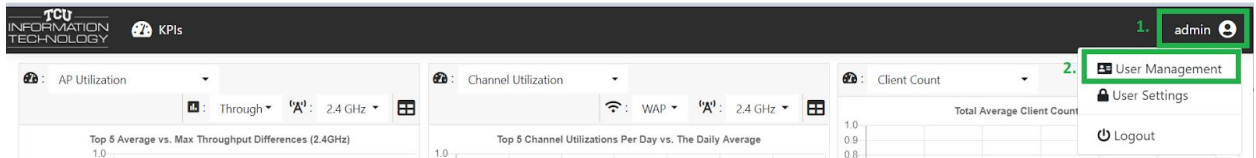
AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

## 6. User Management

### 6.1 Add a User

Any user is able to add another user to the system. In order to add an User:

1. Click your username in the top right
2. Select User Management from the drop down.



3. Add Username, password and confirmation of the password in the dialogue boxes then press "Create User".

## Manage Users

user1
Username
....
Password
....
Confirm Password
<b>Create User</b>

### 6.2 Delete a User

If you want to delete an User from the system then on the User Management page at the bottom you will see delete buttons for each user. Press the delete button on the user you wish to delete.

Username	Actions
admin	
user1	<b>Delete</b>

AP Analytica	Version: 1.1
User Manual	Date: 4/22//2020

When a user is successfully deleted you will no longer see them on the list of users and you will get a notification of the success.

User was successfully deleted!