

#### Introduction

#### Background

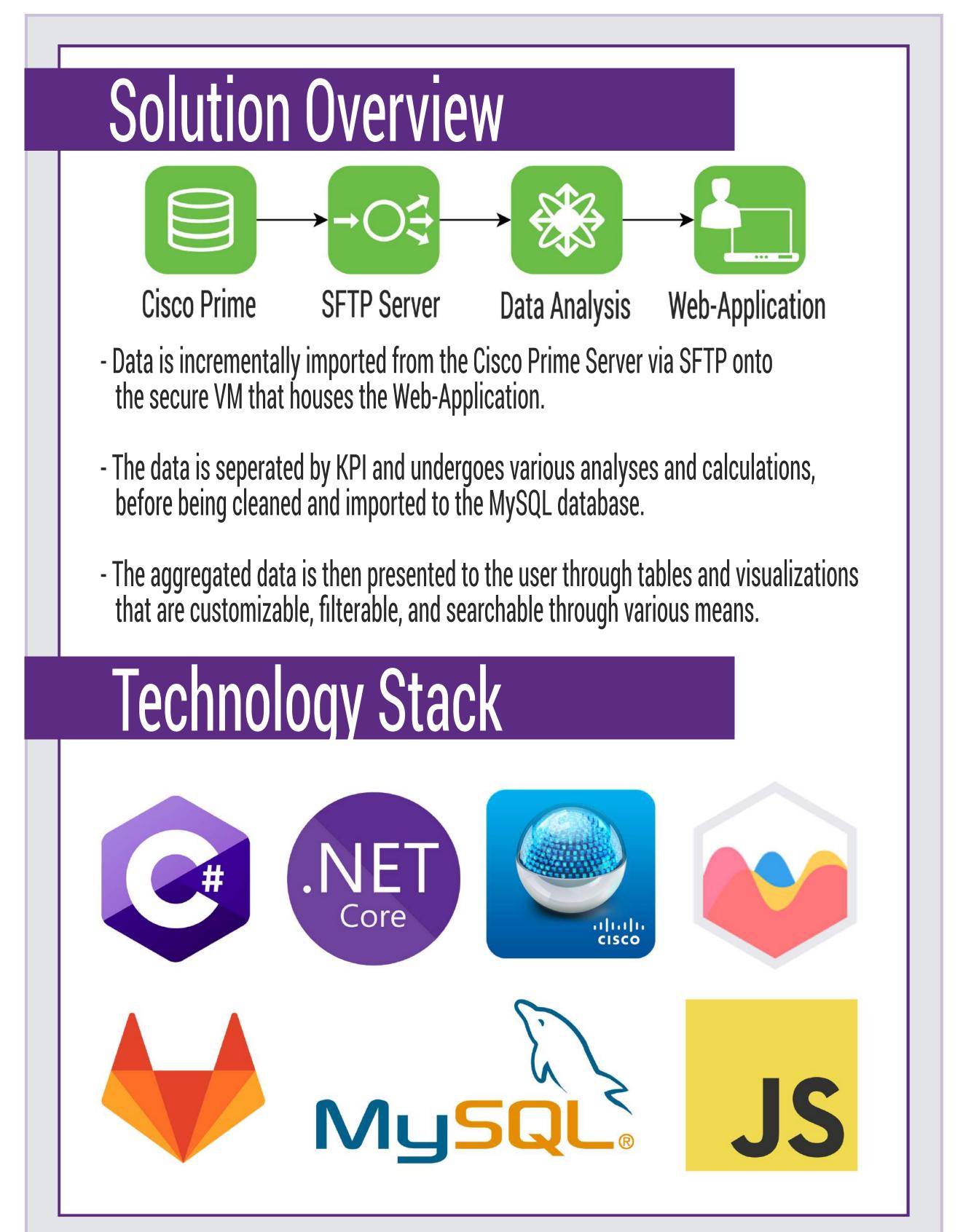
Across TCU's campus, the IT department has over 3,200 Access Points (APs) setup to provide wireless access to students all they way from the Greek Village to the Parking Lots on Sandage Ave. These APs allow student and faculty devices to stay connected seamlessly while on, or traveling across campus. As students roam in between buildings, and connect to a variety of Access Points, the APs transmit real-time information to a service called **Cisco Prime**. Cisco Prime is a software interface that provides TCU Network Services with a massive data pipeline. Through Cisco Prime, Network Services has developed a list of **Key Performance Indicators** that they look for when monitoring the system as a whole.

#### Problem

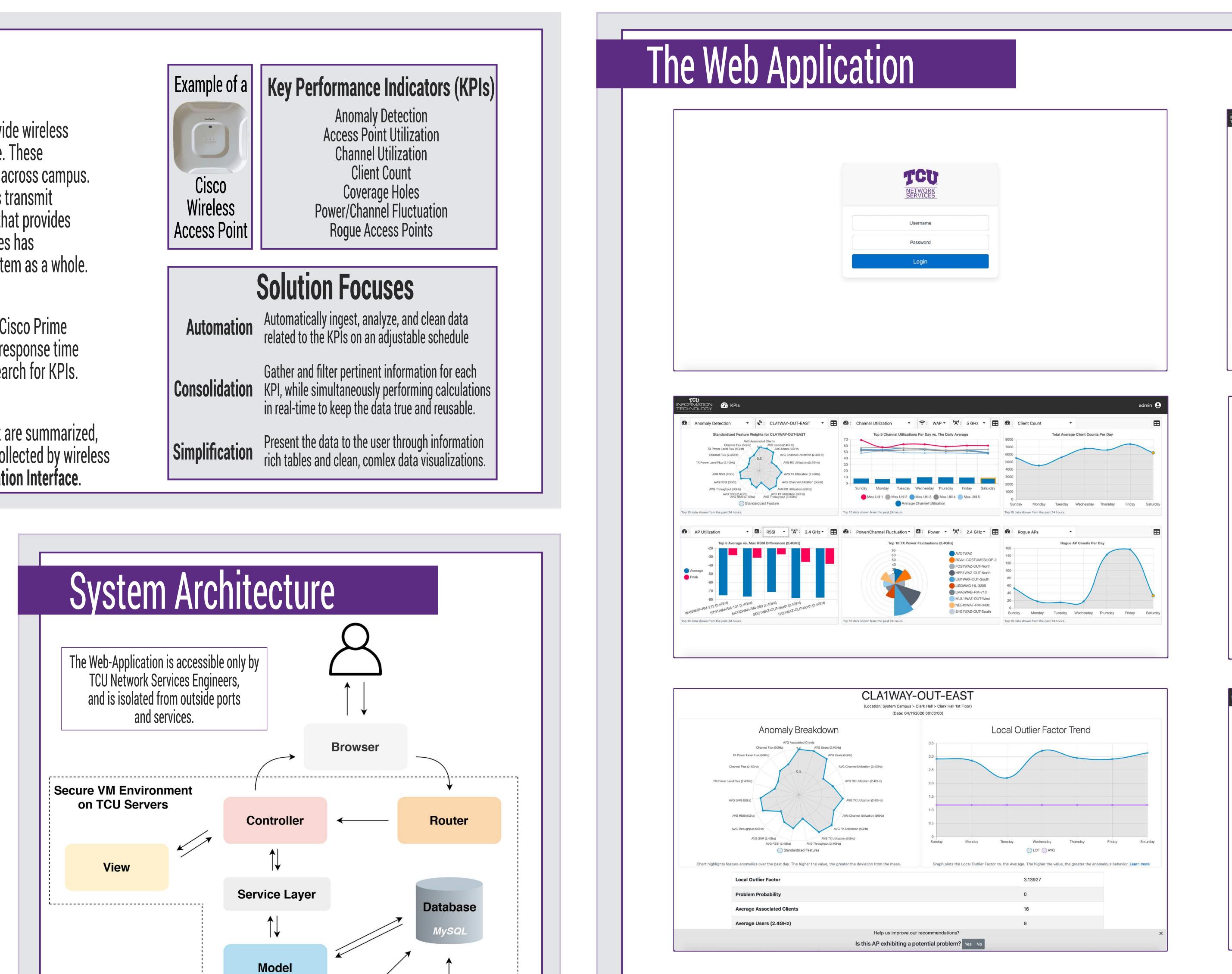
As previously mentioned, this data stream is massive. This leads to a lot of sifting around Cisco Prime in order to find actionable insights. Issues can go unnoticed, and this can lead to a longer response time with limited possibility for proactive measures. Network services needs a better way to search for KPIs.

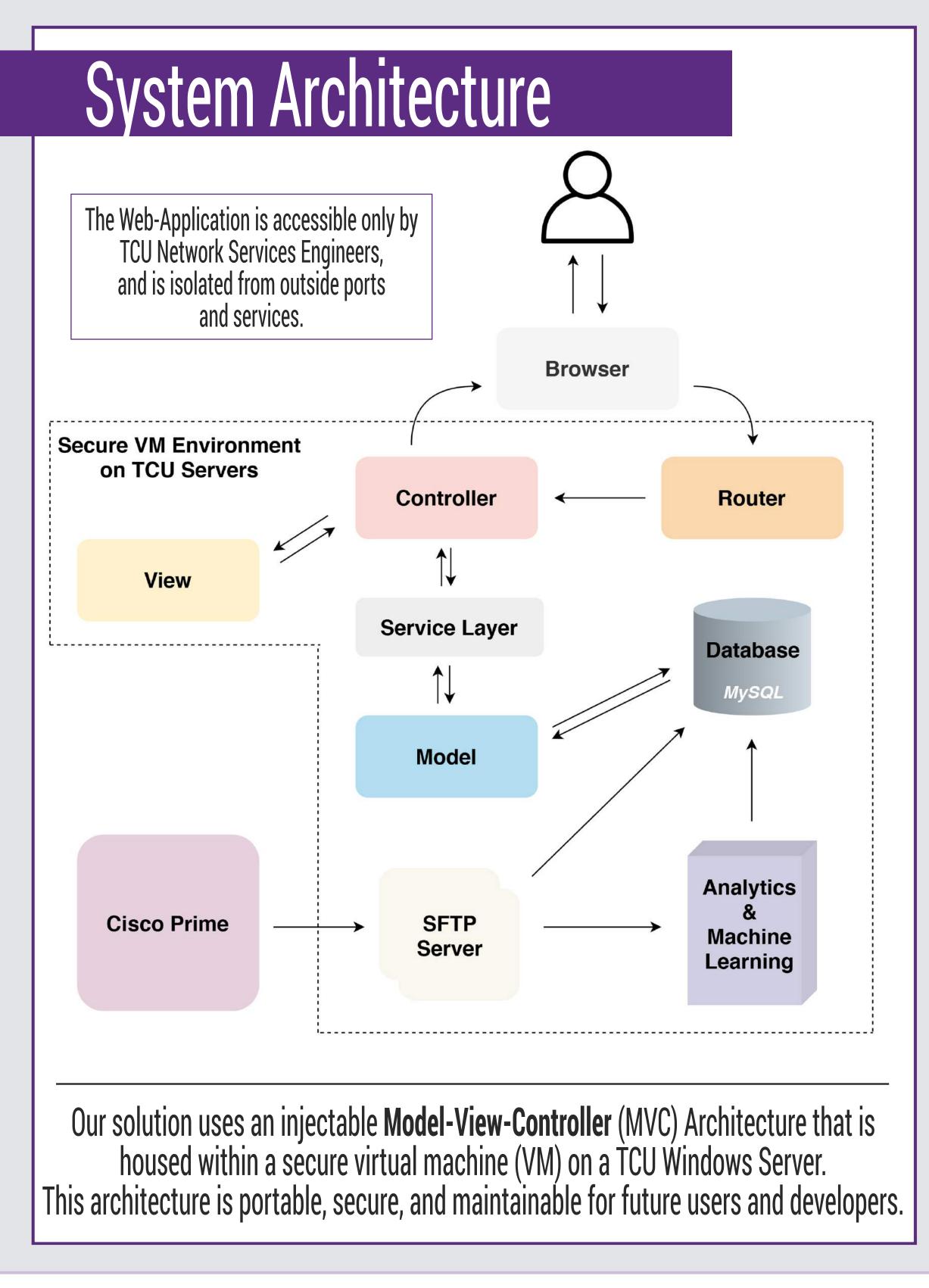
#### Goal

Our platform aims to provide **proactive** and **reactive** insights to TCU Network Services that are summarized, and actionable. These snapshot insights will be extracted from the massive data stream collected by wireless Access Points all over TCU's campus, and then presented through an internal **Web-Application Interface**.



# ACCESS POINT ANALYTICS A Data-Aggregation Platform for TCU Network Services Justis Clark - Hung Doan - Ryan Finnegan - Matt Liddy - Bradley Schoeneweis Faculty Advisor: Bingyang Wei, Ph.D (COSC); Craig Baugh (TCU IT)





## Acknowledgements

Our team would like to thank TCU Network Services, specifically Craig Baugh for letting us be creative and giving us the opportunity to develop this Web-Application, and always being accessible.

We'd also like to thank Dr. Bingyang Wei for his dedication to our class and our team, even with the unorthodox final semester we've had, and the COSC Faculty for supporting us these past 4 years.



TCU RMATION -NOLOGY	🕐 KPIs												admin 🌔
: AP Utilization	1	*	<b>''A''</b> : 2.4	GHz •	Channel Utilization	• 🙃: WAP •	<b>'</b> 'A') :	2.4 GHz -	🙆 : Clier	nt Count	•		C
AP Name \$	Avg Clients	<ul> <li>Peak Throughput \$</li> </ul>	Peak RSSI \$	Peak SNR \$	AP Name 🗢	Channel Util 🛛 🔫	RX Util	♦ TX Util ♦	A	P Name 🗢	Avg Client Count 🛛 🗢	Max Client	Count
A1WAC-HL-106	9.66	22.8	-54	90	FA21WAZ-OUT-North	83.1818	0.0000	0.0909	CLAIV	VAY-OUT-EAST	16	254	1
P2WAC-RM-205	8.01	0.11	-36	61	KIN1WAZ-OUT-North	69.4286	0.0260	4.9870	SWR	IWAQ-RM-LH1	10	130	)
L2WAD-RM-226	7.22	4.29	-31	65	REC1WAY-OUT-North	65.7368	0.000	6.6711	TUC1W	AZ-OUT-NORTH	7	122	6
IE3WAI-RM-312	5.9	0.12	-46	42	SHE1WAZ-OUT-South	62.4247	0.0000	5.2877	MBN	1WAH-RM-141	6	101	
N4WAC-RM-416	5.75	2.51	-29	61	AVO1WAW	61.8831	0.0000	0.0000	SWR	WAN-RM-LH2	8	95	
R4WAH-RM-420	4.56	0.31	-48	40	FOS1WAZ-OUT-North	61.2466	0.0000	2.5616	BAI1W	AZ-OUT-North	5	86	
B3WAF-HL-3141	4.05	0.02	-50	43	AVO1WAV	59.7403	0.000	0.0000	LANI	VAZ-OUT-West	3	85	
JL2WAA-RM-210	3.98	0	-55	39	AVO1WAZ	58.7792	0.000	0.0000	NEE52	WAE-RM-2408	7	82	
32WAI-RM-2230	3.81	1.08	-33	55	GMS6WAQ-RM-613	57.6364	0.0130	0.3896	NEE3	1WAD-HL-1301	6	79	
A3WAB-RM-312	3.73	0	-54	36	CLA1WAZ-OUT-West	56.7143	0.000	6.9481	SWR1	WAM-RM-LH2	6	79	
Coverage Ho	les	÷		¢	Power/Channel Fluctuati	ion •	(A.) :	2.4 GHz -	🙆 : Rog	ue APs	•		C
AP Name	¢ Fai	led Client 👻 Tot	al Clients 💠	Time ¢	AP Name 🗢	TX Power Level Flux	-	Channel Flux 🔶	Reason ¢	MAC Address \$	Location	¢ State ¢	Time
MUL1WAD-RM-11	1	20	3	08:48 AM	LIB1WAX-OUT-South	67		1	Loud SSID	c2:d2:f3:5e:1d:be	GrandMarc South 4th	Alert	03:43 PM
MUL2WAD-RM-2	11	11	8	07:38 AM	HER1WAZ-OUT-North	58		0	Loud SSID	1e:5c:25:a7:bd:3f	Sadler 3rd Floor	Alert	02:15 PM
SWR1WAQ-RM-LH	-11	4	23	11:47 AM	BGA1-COSTUMESHOP-2	37		0	Loud SSID	f2:6e:0b:c3:b6:d4	Rees-Jones 2nd Floor	Alert	01:22 PM
REE2WAI-RM-20	2	3	5	04:50 PM	AVO1WAZ	31		0	Loud SSID	be:70:85:64:a8:c4	GrandMarc South 6th Floor	Alert	12:29 PM
RJH3WAI-HL-31	3	3	2	05:07 PM	LIB3WAG-HL-3209	30		0	Loud SSID	38:9d:92:36:2a:69	GrandMarc North 5th Floor	Alert	12:28 PM
REE2WAI-RM-20	2	0	0	04:51 PM	NEE43WAF-RM-3402	30		1	Loud SSID	22:ad:56:31:67:30	Jane Justin Soccer 1st Floor	Alert	12:15 PM
	3	0	0	05:10 PM	MUL1WAZ-OUT-West	23		0	Loud SSID	f8:2d:c0:59:90:70	Pond Street Data Center 1st Fl	Alert	09:05 AM
RJH3WAI-HL-31	11	0	0	07:40 AM	FOS1WAZ-OUT-North	22		0	Loud SSID	be:88:73:16:3c:fd	Milton Daniel Hall 2nd Floor	Alert	06:09 AM
RJH3WAI-HL-31 MUL2WAD-RM-2			0	08:49 AM	SHE1WAZ-OUT-South	21		0	Loud SSID	8a:9f:29:bc:25:f6	Richards 3rd Floor	Alert	05:21 AN
		0	0										
MUL2WAD-RM-2	1	0	0	11:48 AM	LMA3WAB-RM-710	19		2	Loud SSID	00:0e:8e:5f:a3:ce	Library 2nd Floor	Alert	03:39 AM

<b>6,223</b> Today's average client count			-15% increase in average clients since yesterday			<b>34,379</b> Today's maximum client count			
Past Day	Past Day 🔹					م	Search by AP Name		
AP Name	٠	AP IP Address	٠	Average Associated Client	Maximum	Associated Client *	Time +		
CLA1WAY-OUT-E	AST	10.40.164.14		16	254		4/11/2020 12:00 AM		
SWR1WAQ-RM-	LH1	10.40.248.59	10		130		4/11/2020 12:00 AM		
TUC1WAZ-OUT-N	ORTH	10.40.220.20	7		122		4/11/2020 12:00 AM		
MBN1WAH-RM-	141	10.40.132.33	6			101	4/11/2020 12:00 AM		
SWR1WAN-RM-LH2		10.40.248.70		8		95	4/11/2020 12:00 AM		
BAI1WAZ-OUT-N	orth	10.40.236.21		Б	86		4/11/2020 12:00 AM		
LAN1WAZ-OUT-West		10.40.120.18		3		85	4/11/2020 12:00 AM		
NEE52WAE-RM-2408		10.40.88.112		Z		82	4/11/2020 12:00 AM		
NEE31WAD-HL-1301		10.40.88.100		6		79	4/11/2020 12:00 AM		
SWR1WAM-RM-LH2 10.40.248.69		6		79		4/11/2020 12:00 AM			
				₩ ₩ 1/324 ₩ ₩					
CLA1WAY-OUT-EAST CLA3WAL-RM-320 MBS3WAB-RM-340 PAL2WAC-RM-223 REC1WAE-HL-103 REC2WAD-HL-202 SHE3WAD-RM-388 STR1WAC-RM-105 STR1WAC-RM-118 SWR1WAQ-RM-LH1	10 Average	Client Counts	8000 7000 6000 5000 4000 3000 2000 1000 0 Sunday	Total Average Client Cou	Ints	300 250 200 Max 150 100 50	ge vs. Max Differences		

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	Manage Us	ers	
	Username		
	Username		
	Password		
	Password		
	Confirm Password		
	Confirm Password		
	Create User		
	Username	Actions	
	admin		

### References

- .NET Core Documentation: https://docs.microsoft.com/en-us/dotnet/
- jQuery Documentation: https://api.jquery.com/
- Chart.JS Documentation: https://www.chartis.org/docs/latest/
- jQuery Tablesorter Documentation: https://mottie.github.io/tablesorter/docs/
- Stack Overflow: https://stackoverflow.com/