Categorical Variables

For each variable, we perform a Chi-sqaure test to determine if there is a statistically significant relation between variable. We then perform a comparison between of the percentage of vulnerabilities of each type for each variable.

For v.2 variables, data is from 2010- 2019, for v.3, data is from 2016 -2019.

v.2 Severity

Chi-square

Table v.2 Severity				
type	**v. 2 Severity**			
	HIGH	**LOW**	**MEDIUM**	**Total**
A	34 34.34	4 4.04	61 61.62	99
C	156 58.21	17 6.34	95 35.45	268
E	743 43.17	98 5.69	880 51.13	1721
H	639 44.07	105 7.24	706 48.69	1450
M	178 44.28	48 11.94	176 43.78	402
P	42 48.28	11 12.64	34 39.08	87
S	466 46.79	59 5.92	471 47.29	996
Total	2258	342	2423	5023

Overview for v.2 Severity

Statistic	**DDL**	**Value**	**Prob**
Chi-2	12	60.3685	<.0001
likelihood ratio test	12	57.0857	<.0001
Mantel-Haenszel Chi-2	1	1.4222	0.2330
Coefficient Phi		0.1096	
Contingency Coefficient		0.1090	
Cramer V		0.0775	

Sample size = 5023

Obs.	type	v.2 Severity	Mu	StdErrMu	COUNT	Line1	Line2
1	A	HIGH	0.3434	0.05890	34	B	
2	E	HIGH	0.4317	0.01584	743	B	
3	H	HIGH	0.4407	0.01743	639	B	
4	M	HIGH	0.4428	0.03319	178	B	
5	S	HIGH	0.4679	0.02167	466	B	
6	P	HIGH	0.4828	0.07449	42	B	A
7	C	HIGH	0.5821	0.04660	156		A
8	A	LOW	0.04040	0.02020	4	A	
9	E	LOW	0.05694	0.005752	98	A	
10	S	LOW	0.05924	0.007712	59	A	
11	C	LOW	0.06343	0.01538	17	A	
12	H	LOW	0.07241	0.007067	105	A	
13	M	LOW	0.1194	0.01723	48	A	
14	P	LOW	0.1264	0.03812	11	A	
15	C	MEDIUM	0.3545	0.03637	95		C
16	P	MEDIUM	0.3908	0.06702	34	B	C
17	M	MEDIUM	0.4378	0.03300	176	B	C
18	S	MEDIUM	0.4729	0.02179	471	B	A
19	H	MEDIUM	0.4869	0.01832	706	B	A
20	E	MEDIUM	0.5113	0.01724	880	B	A
21	A	MEDIUM	0.6162	0.07889	61		A

v.2 Attack complexity

Table v.2 Attack complexity				
type	**v.2 Attack complexity**			
	HIGH	**LOW**	**MEDIUM**	**Total**
A	1 1.01	63 63.64	35 35.35	99
C	2 0.75	220 82.09	46 17.16	268
E	42 2.44	1200 69.73	479 27.83	1721
H	16 1.10	1026 70.76	408 28.14	1450
M	23 5.72	199 49.50	180 44.78	402
P	2 2.30	60 68.97	25 28.74	87
S	13 1.31	751 75.40	232 23.29	996
Total	99	3519	1405	5023

Overview for v.2 Attack complexity

Statistic	DDL	Value	Prob
Chi-2	12	137.0519	<.0001
likelihood ratio test	12	127.4335	<.0001
Mantel-Haenszel Chi-2	1	0.2865	0.5925
Coefficient Phi		0.1652	
Contingency Coefficient		0.1630	
Cramer V		0.1168	

Sample Size = 5023

Obs.	type	complexV2	Mu	StdErrMu	COUNT	Line1	Line2
1	C	HIGH	0.007463	0.005277	2	B	
2	A	HIGH	0.01010	0.01010	1	B	A
3	H	HIGH	0.01103	0.002759	16	B	A
4	S	HIGH	0.01305	0.003620	13	B	A
5	P	HIGH	0.02299	0.01626	2	B	A
6	E	HIGH	0.02440	0.003766	42	B	A
7	M	HIGH	0.05721	0.01193	23		A
8	M	LOW	0.4950	0.03509	199	B	
9	A	LOW	0.6364	0.08017	63	B	A
10	P	LOW	0.6897	0.08903	60		A
11	E	LOW	0.6973	0.02013	1200		A
12	H	LOW	0.7076	0.02209	1026		A
13	S	LOW	0.7540	0.02751	751		A
14	C	LOW	0.8209	0.05534	220		A
15	C	MEDIUM	0.1716	0.02531	46	D	
16	S	MEDIUM	0.2329	0.01529	232	D	C
17	E	MEDIUM	0.2783	0.01272	479	B	C
18	H	MEDIUM	0.2814	0.01393	408	B	C
19	P	MEDIUM	0.2874	0.05747	25	B	C
20	A	MEDIUM	0.3535	0.05976	35	B	A
21	M	MEDIUM	0.4478	0.03337	180		A

v.2 Access Vector

Table for v.2 AccessVector				
type	**v.2 Access Vector**			
	ADJACENT_NETWORK	**LOCAL**	**NETWORK**	**Total**
A	3 3.03	3 3.03	93 93.94	99
C	19 7.09	167 62.31	82 30.60	268
E	122 7.09	206 11.97	1393 80.94	1721
H	126 8.69	74 5.10	1250 86.21	1450
M	28 6.97	114 28.36	260 64.68	402
P	1 1.15	34 39.08	52 59.77	87
S	54 5.42	50 5.02	892 89.56	996
Total	353	648	4022	5023

Overview for V.2 Access Vector

Statistic	**DDL**	**Valeur**	**Prob**
Chi-2	12	887.5656	<.0001
likelihood ratio test	12	673.4491	<.0001
Mantel-Haenszel Chi-2	1	44.1169	<.0001
Coefficient Phi		0.4204	
Contingency Coefficient		0.3875	
Cramer V		0.2972	

Sample Size = 5023

Obs.	type	V2AccessVector	Mu	StdErrMu	COUNT	Line1	Line2
1	P	ADJACENT_NETWORK	0.01149	0.01149	1	B	
2	A	ADJACENT_NETWORK	0.03030	0.01750	3	B	A
3	S	ADJACENT_NETWORK	0.05422	0.007378	54	B	A
4	M	ADJACENT_NETWORK	0.06965	0.01316	28	B	A
5	E	ADJACENT_NETWORK	0.07089	0.006418	122	B	A
6	C	ADJACENT_NETWORK	0.07090	0.01626	19	B	A
7	H	ADJACENT_NETWORK	0.08690	0.007741	126		A
8	A	LOCAL	0.03030	0.01750	3	D	
9	S	LOCAL	0.05020	0.007099	50	D	
10	H	LOCAL	0.05103	0.005933	74	D	
11	E	LOCAL	0.1197	0.008340	206	C	
12	M	LOCAL	0.2836	0.02656	114	B	
13	P	LOCAL	0.3908	0.06702	34	B	
14	C	LOCAL	0.6231	0.04822	167	A	
15	C	NETWORK	0.3060	0.03379	82	C	
16	P	NETWORK	0.5977	0.08289	52	B	
17	M	NETWORK	0.6468	0.04011	260	B	
18	E	NETWORK	0.8094	0.02169	1393	A	
19	H	NETWORK	0.8621	0.02438	1250	A	
20	S	NETWORK	0.8956	0.02999	892	A	
21	A	NETWORK	0.9394	0.09741	93	A	

v.3 Attack complexity

Table for Attack Complexity v.3			
type			
	HIGH	**LOW**	**Total**
A	5 7.25	64 92.75	69
C	32 12.65	221 87.35	253
E	77 10.56	652 89.44	729
H	70 6.42	1020 93.58	1090
M	40 13.75	251 86.25	291
P	12 19.67	49 80.33	61
S	66 8.99	668 91.01	734
Total	302	2925	3227

Overview for v.3 Attack Complexity

Statistic	DDL	Value	Prob
Chi-2	6	30.2849	<.0001
likelihood ratio test	6	28.8134	<.0001
Mantel-Haenszel Chi-2	1	0.0185	0.8918
Coefficient Phi		0.0969	
Contingency Coefficient		0.0964	
Cramer V		0.0969	

Sample Size = 3227

Obs.	type	complexV3	Mu	StdErrMu	COUNT	Line1	Line2
1	H	HIGH	0.06422	0.007676	70	B	
2	A	HIGH	0.07246	0.03241	5	B	A
3	S	HIGH	0.08992	0.01107	66		A
4	E	HIGH	0.1056	0.01204	77		A
5	C	HIGH	0.1265	0.02236	32		A
6	M	HIGH	0.1375	0.02173	40		A
7	P	HIGH	0.1967	0.05679	12		A
8	P	LOW	0.8033	0.1148	49	A	
9	M	LOW	0.8625	0.05444	251	A	
10	C	LOW	0.8735	0.05876	221	A	
11	E	LOW	0.8944	0.03503	652	A	
12	S	LOW	0.9101	0.03521	668	A	
13	A	LOW	0.9275	0.1159	64	A	
14	H	LOW	0.9358	0.02930	1020	A	

v.3 Access Vector

Table for v.3 Access Vector					
type					
	ADJACENT_NETWORK	**LOCAL**	**NETWORK**	**PHYSICAL**	**Total**
A	3 4.35	1 1.45	64 92.75	1 1.45	69
C	19 7.51	150 59.29	74 29.25	10 3.95	253
E	57 7.82	105 14.40	556 76.27	11 1.51	729
H	97 8.90	46 4.22	925 84.86	22 2.02	1090
M	17 5.84	140 48.11	89 30.58	45 15.46	291
P	0 0.00	21 34.43	31 50.82	9 14.75	61
S	50 6.81	27 3.68	643 87.60	14 1.91	734
Total	243	490	2382	112	3227

Overview for V.3 Access Vector

Statistic	**DDL**	**Value**	**Prob**
Chi-2	18	1066.6381	<.0001
likelihood ratio test	18	899.7322	<.0001
Mantel-Haenszel Chi-2	1	43.2178	<.0001
Coefficient Phi		0.5749	
Contingency Coefficient		0.4984	
Cramer V		0.3319	

Sample Size = 3227

Obs.	type	V3AccessVector	Mu	StdErrMu	COUNT	Line1	Line2
1	P	ADJACENT_NETWORK	3.39E-10	2.359E-6	0	A	
2	A	ADJACENT_NETWORK	0.04348	0.02510	3	A	
3	M	ADJACENT_NETWORK	0.05842	0.01417	17	A	
4	S	ADJACENT_NETWORK	0.06812	0.009634	50	A	
5	C	ADJACENT_NETWORK	0.07510	0.01723	19	A	
6	E	ADJACENT_NETWORK	0.07819	0.01036	57	A	
7	H	ADJACENT_NETWORK	0.08899	0.009036	97	A	
8	A	LOCAL	0.01449	0.01449	1		D
9	S	LOCAL	0.03678	0.007079	27		D
10	H	LOCAL	0.04220	0.006222	46		D
11	E	LOCAL	0.1440	0.01406	105		C
12	P	LOCAL	0.3443	0.07512	21	B	
13	M	LOCAL	0.4811	0.04066	140	B	A
14	C	LOCAL	0.5929	0.04841	150		A
15	C	NETWORK	0.2925	0.03400	74	C	
16	M	NETWORK	0.3058	0.03242	89	C	
17	P	NETWORK	0.5082	0.09127	31	B	
18	E	NETWORK	0.7627	0.03235	556	A	
19	H	NETWORK	0.8486	0.02790	925	A	
20	S	NETWORK	0.8760	0.03455	643	A	
21	A	NETWORK	0.9275	0.1159	64	A	
22	A	PHYSICAL	0.01449	0.01449	1	B	
23	E	PHYSICAL	0.01509	0.004550	11	B	
24	S	PHYSICAL	0.01907	0.005098	14	B	
25	H	PHYSICAL	0.02018	0.004303	22	B	
26	C	PHYSICAL	0.03953	0.01250	10	B	
27	P	PHYSICAL	0.1475	0.04918	9	A	
28	M	PHYSICAL	0.1546	0.02305	45	A	

Numerical Variables

	v.2 Base Score			v.2 Exploitability Score			v.2 Impact Score		
	N	Mean	Std	N	Mean	Std	N	Mean	Std
type									
A	99	6.08	2.02	99	9.03	1.41	99	5.09	2.62
C	268	6.59	1.96	268	5.75	2.68	268	7.97	2.43
E	1721	6.40	1.94	1721	8.17	2.17	1721	6.13	2.70
H	1450	6.67	2.15	1450	8.54	1.71	1450	6.26	2.90
M	402	6.36	2.24	402	7.15	2.52	402	6.75	2.92
P	87	6.37	2.52	87	6.90	2.72	87	6.92	3.09
S	996	6.64	2.06	996	8.91	1.72	996	5.97	2.75

	v.3 Base Score			v.3 Exploitability score			V.3 Impact Score		
	N	Mean	Std	N	Mean	Std	N	Mean	Std
type									
A	69	7.98	1.67	69	3.23	0.76	69	4.57	1.42
C	253	7.67	1.38	253	2.25	1.00	253	5.29	1.03
E	729	7.46	1.52	729	2.83	1.04	729	4.52	1.40
H	1090	8.05	1.50	1090	3.00	0.95	1090	4.94	1.33
M	291	6.87	1.62	291	2.09	1.05	291	4.71	1.34
P	61	6.74	1.54	61	1.94	1.12	61	4.64	1.47
S	734	7.93	1.62	734	3.25	0.89	734	4.59	1.47

Obs.	Dependent	type	LSMean	StdErr	Line1	Line2	Line3
1	ExploitScore	C	5.75111940	0.12375195	E		
2	ExploitScore	P	6.89885057	0.21720000	D		
3	ExploitScore	M	7.15373134	0.10104305	D		
4	ExploitScore	E	8.16932016	0.04883476	C		
5	ExploitScore	H	8.54262069	0.05320292	B		
6	ExploitScore	S	8.91275100	0.06419331	A		
7	ExploitScore	A	9.02525253	0.20361129	A		
8	ImpactScore	A	5.09494949	0.27956625		E	
9	ImpactScore	S	5.96526104	0.08813992	D		
10	ImpactScore	E	6.13149332	0.06705203	D	C	
11	ImpactScore	H	6.26358621	0.07304968		C	
12	ImpactScore	M	6.74577114	0.13873605		B	
13	ImpactScore	P	6.92298851	0.29822408		B	
14	ImpactScore	C	7.96716418	0.16991626		A	
15	V2BaseScore	A	6.07575758	0.20726791			C
16	V2BaseScore	M	6.35746269	0.10285766	B		C
17	V2BaseScore	P	6.37241379	0.22110067	B	A	C
18	V2BaseScore	E	6.40296339	0.04971177	B	A	C
19	V2BaseScore	C	6.58694030	0.12597439	B	A	
20	V2BaseScore	S	6.64267068	0.06534615		A	
21	V2BaseScore	H	6.66993103	0.05415838		A	

Obs.	Dependent	type	LSMean	StdErr	Line1	Line2
1	V3BaseScore	P	6.74098361	0.19701800		D
2	V3BaseScore	M	6.86907216	0.09020369		D
3	V3BaseScore	E	7.46364883	0.05699110		C
4	V3BaseScore	C	7.67351779	0.09674100	B	C
5	V3BaseScore	S	7.93378747	0.05679666	B	A
6	V3BaseScore	A	7.97971014	0.18524490	B	A
7	V3BaseScore	H	8.04688073	0.04660769		A
8	V3ExplScore	P	1.93606557	0.12428256	E	
9	V3ExplScore	M	2.08762887	0.05690214	E	D
10	V3ExplScore	C	2.24901186	0.06102599		D
11	V3ExplScore	E	2.82757202	0.03595103		C
12	V3ExplScore	H	3.00495413	0.02940098	B	
13	V3ExplScore	A	3.23333333	0.11685587	B	A
14	V3ExplScore	S	3.25408719	0.03582837		A
15	V3ImpactScore	E	4.52222222	0.05045977	C	
16	V3ImpactScore	A	4.56956522	0.16401534	C	
17	V3ImpactScore	S	4.59305177	0.05028761	C	
18	V3ImpactScore	P	4.64426230	0.17443921	C	B
19	V3ImpactScore	M	4.70652921	0.07986611	C	B
20	V3ImpactScore	H	4.93688073	0.04126632		B
21	V3ImpactScore	C	5.29011858	0.08565422		A