Republic of the Philippines

Laguna State Polytechnic University

Province of Laguna

Final Examination

ALLEN DON TOBIAS

PRINCE JORAN DELGADO

Bachelor of Science in Information Technology

Web and Mobile Application Development - 3A

ITEP 309 – Networking 2

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INTRODUCTION

Mr. Rufus Shinra became the new CEO of Shinra Electric Power Company after his father's death in the city of Midgar; the company is going thru transition and will whitewash their old offices into a new one. The company's main job is to give the residents of Midgar a Mako (Nuclear) powered electricity. The company has 3 office rooms located in 3 different building around the city, with 1 functioning as the Main Headquarters. He hired you as a Network Engineer to create a plan to renew his 3 offices. These are the things he discussed with you during the meeting:

1) He already has available computer units from each of the offices and tells you to utilize them.
2) The company has at least 15 computer units per Office that were used for work related functions such as frontline services, billing, call center for online inquiries and technical support team.
3) You need to reorganize all computer networks in the 3 offices around the city and wanted to have a consolidated data in the main headquarters.
4) The company should have a stable internet connection at all times because they have online transactions with the client.
5) Budget is not an issue since they own the electricity in the whole Country.

NETWORK TOPOLOGY

An extensively used network architecture that is well-known for its scalability and costeffectiveness is the extended star topology. It is an excellent option for Shinra Electric Power Company because it is especially beneficial for large-scale networks. In this topology, each office in the city of Midgar is represented by a number of peripheral nodes that are connected to a central hub, which is usually housed in the main headquarters.

We keep to what customers actually need since they want better internet speed. We constructed a DNS and HTTP servers so that employees could easily reach their website, shinraepcompany.com. In order for the router to get data from the internet provider's server and from them much faster, we also utilized fiber. Instead of using router-to-router connections, we used router-to-switch connections to increase security. This stops computers from transmitting data to and from other office buildings.

We placed security cameras throughout the office to increase security. We installed smoke detectors in the server room and kitchen to ensure the security of the workplaces. The server room has a smart air conditioner and smart door of its own.

The network design is reasonably priced. Apart from the primary goal of obtaining a faster internet connection, we only made additions to the things that the workplace actually requires.

BUDGET PLAN

DEVICE	QUANTITY	UNIT PRICE	TOTAL PRICE
STOCK COMPUTER	15	0	0
NEW COMPUTER	1	₱ 63,995	₱ 63,995
CCTV	18	₱ 12,400	₱ 223,200
LAPTOP	3	₱ 15,675	₱ 47,025
ALARM SIREN	4	₱ 3,877	₱ 15,508
SMOKE DETECTOR	4	₱ 450	₱ 1,800
DOOR	1	₱ 3,000	₱ 3,000
AIR CONDITION	1	₱ 10,999	₱ 10,999
CROSS-OVER CABLE (15 ft.)	6	₱ 2,450	₱ 14,700
STRAIGHT THROUGH CABLE (15 ft.)	45	₱ 4,977	₱ 223,965
SERIAL DTE CABLE (10 ft.)	5	₱ 1,327	₱ 6,635
DNS SERVER	1	₱ 166,500	₱ 166,500
HTTP SERVER	1	₱ 303,508	₱ 303,508
ROUTER	3	₱ 2,240	₱ 6,720
ACCESS POINT	6	₱ 1,790	₱ 10,740
GATEWAY	3	₱ 817	₱ 2,451
SWITCH-TT	9	₱ 2,215	₱ 19,935
SWITCH-PT	1	₱ 7,898	₱ 7,898
			OVER-ALL TOTAL: ₱ 1,128,579

TABLE 2. Devices used in Cisco Packet Tracer

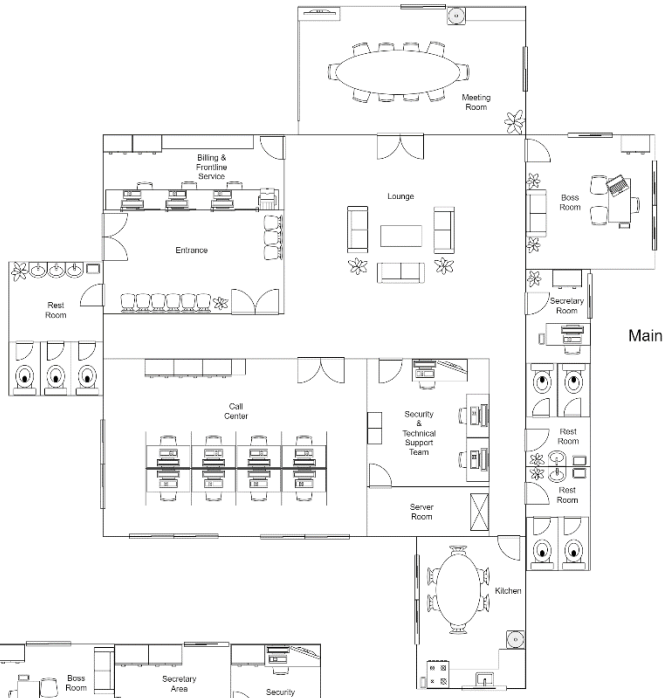
DEVICE	DEVICE TYPE	DESCRIPTION	IP ADDRESS	IP CLASS
SWITCH	CENTRAL	(HQ) BILLING & FRONTLINE SERVICE	32.0.0.1	A
		(HQ) CALL CENTER	33.0.0.1	A
		(HQ) SECURITY	34.0.0.1	A
		(OFF1) BILLING & FRONTLINE SERVICE	12.0.0.1	A
		(OFF1) CALL CENTER 1	13.0.0.1	A
		(OFF1) CALL CENTER 2	14.0.0.1	A
		(OFF2) BILLING & FRONTLINE SERVICE	22.0.0.1	A
		(OFF2) CALL CENTER	23.0.0.1	A
		(OFF2) SECURITY	24.0.0.1	A
ACCESS POINT	NODE	(HQ) LOUNGE X2	30.0.0.1	A
			31.0.0.1	A
		(OFF1) CALL CENTER AREA X2	11.0.0.1	A

		(OFF2) LOUNGE & BOSS ROOM	10.0.0.1 20.0.0.1 21.0.0.1	**A** **A** **A**
CCTV	**END**	**(HQ) BILLING X1** **(HQ) ENTRANCE X1** **(HQ) LOUNGE X1** **(HQ) CALL CENTER X1** **(HQ) SECURITY X1** **(HQ) SERVER ROOM X1** **(OFF1) BILLING X1** **(HQ) ENTRANCE X1** **(OFF1) LOUNGE X1** **(OFF1) OUSIDE OF SECURITY ROOM X1** **(OFF1) INSIDE OF SECURITY ROOM X1** **(OFF2) BILLING X1** **(OFF2) ENTRANCE X1** **(OFF2) LOUNGE 1 X1** **(OFF2) LOUNGE 2 X1** **(OFF2) SECURITY X1** **(OFF2) CALL CENTER X1**	192.168.25.108 192.168.25.110 192.168.25.100 192.168.25.112 192.168.25.104 192.168.25.122 192.168.25.107 192.168.25.110 192.168.25.104 192.168.25.105 192.168.25.100 192.168.25.118 192.168.25.101 192.168.25.115 192.168.25.102 192.168.25.111 192.168.25.106	**C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C** **C**
PC	**END**	**(HQ) BILLING X3** **(HQ) CALL CENTER X8** **(HQ) SECURITY X2** **(HQ) SECRETARY ROOM X1** **(OFF1) CALL CENTER X12**	32.0.0.2 32.0.0.3 32.0.0.4 33.0.0.2 33.0.0.3 33.0.0.4 33.0.0.5 33.0.0.6 33.0.0.7 33.0.0.8 33.0.0.9 34.0.0.3 34.0.0.4 31.0.0.2 13.0.0.2 13.0.0.3 13.0.0.4 13.0.0.5 13.0.0.6 13.0.0.7 14.0.0.2 14.0.0.3 14.0.0.4	**A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A** **A**

		(OFF1) BILLING X2	12.0.0.2 12.0.0.3	**A** **A**
		(OFF1) SECRETARY X1 **(OFF1) Technical Support Team X3**	11.0.0.2 14.0.0.5 14.0.0.6 14.0.0.7	**A** **A** **A** **A**
		(OFF2) CALL CENTER X6	22.0.0.2 22.0.0.3 22.0.0.4 22.0.0.5 22.0.0.6 22.0.0.7	**A** **A** **A** **A** **A** **A**
		(OFF2) SECURITY x1	23.0.0.2	**A**
		(OFF2) SECRETARY ROOM X1 **(OFF2) BILLING X2**	21.0.0.2 24.0.0.2 24.0.0.3	**A** **A** **A**
ROUTER	**NETWORK**	**(HQ) RIP ROUTING**	30.0.0.0 31.0.0.0 32.0.0.0 33.0.0.0 34.0.0.0	**A** **A** **A** **A** **A**
		(OFF1) RIP ROUTING	10.0.0.0 11.0.0.0 12.0.0.0 13.0.0.0 14.0.0.0	**A** **A** **A** **A** **A**
		(OFF2) RIP ROUTING	20.0.0.0 21.0.0.0 22.0.0.0 23.0.0.0 24.0.0.0	**A** **A** **A** **A** **A**
SERVER	**END**	**(HQ) SERVER ROOM X2**	DNS - 160.0.0.2 HTTP - 160.0.0.3	**B** **B**
LAPTOP	**END**	**(HQ) BOSS ROOM X1**	30.0.0.2	**A**
		(OFF1) BOSS ROOM X1	20.0.0.2	**A**
		(OFF2) BOSS ROOM X1	10.0.0.2	**A**
DOOR	**END**	**(HQ) SECURITY ROOM X1**	192.168.25.102	**C**
SIREN	**END**	**(HQ) SECURITY ROOM X1**	192.168.25.115	**C**
		(HQ) KITCHEN X1	192.168.25.106	**C**
		(OFF1) KITCHEN X1	192.168.25.114	**C**
		(OFF2) KITCHEN X1	192.168.25.110	**C**

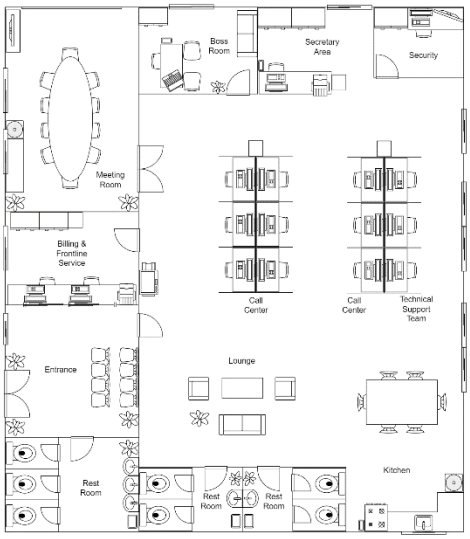
AIR CONDITIONER	**END**	**(HQ) SERVER ROOM X1**	192.168.25.120	**C**
SMOKE DECTECTOR	**END**	**(HQ) SERVER ROOM X1**	192.168.25.111	**C**
		(HQ) KITCHEN X1	192.168.25.118	**C**
		(OFF1) KITCHEN X1	192.168.25.111	**C**
		(OFF2) KITCHEN X1	192.168.25.107	**C**
HOME GATEWAY	**END**	**(HQ) LOUNGE X1**	192.168.25.1	**C**
		(OFF1) OUTSIDE OF SECURITY ROOM X1	192.168.25.1	**C**
		(OFF2) OUTSIDE OF SECURITY ROOM X1	192.168.25.1	**C**
SWITCH-PT	**CENTRAL**	**(HQ) SERVER ROOM X1**		

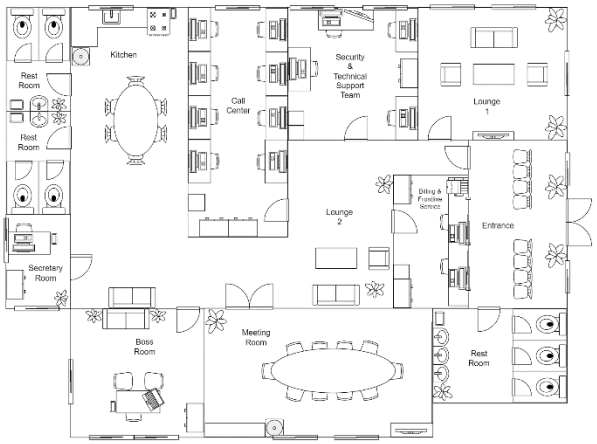
FLOOR PLAN



Main Headquarters

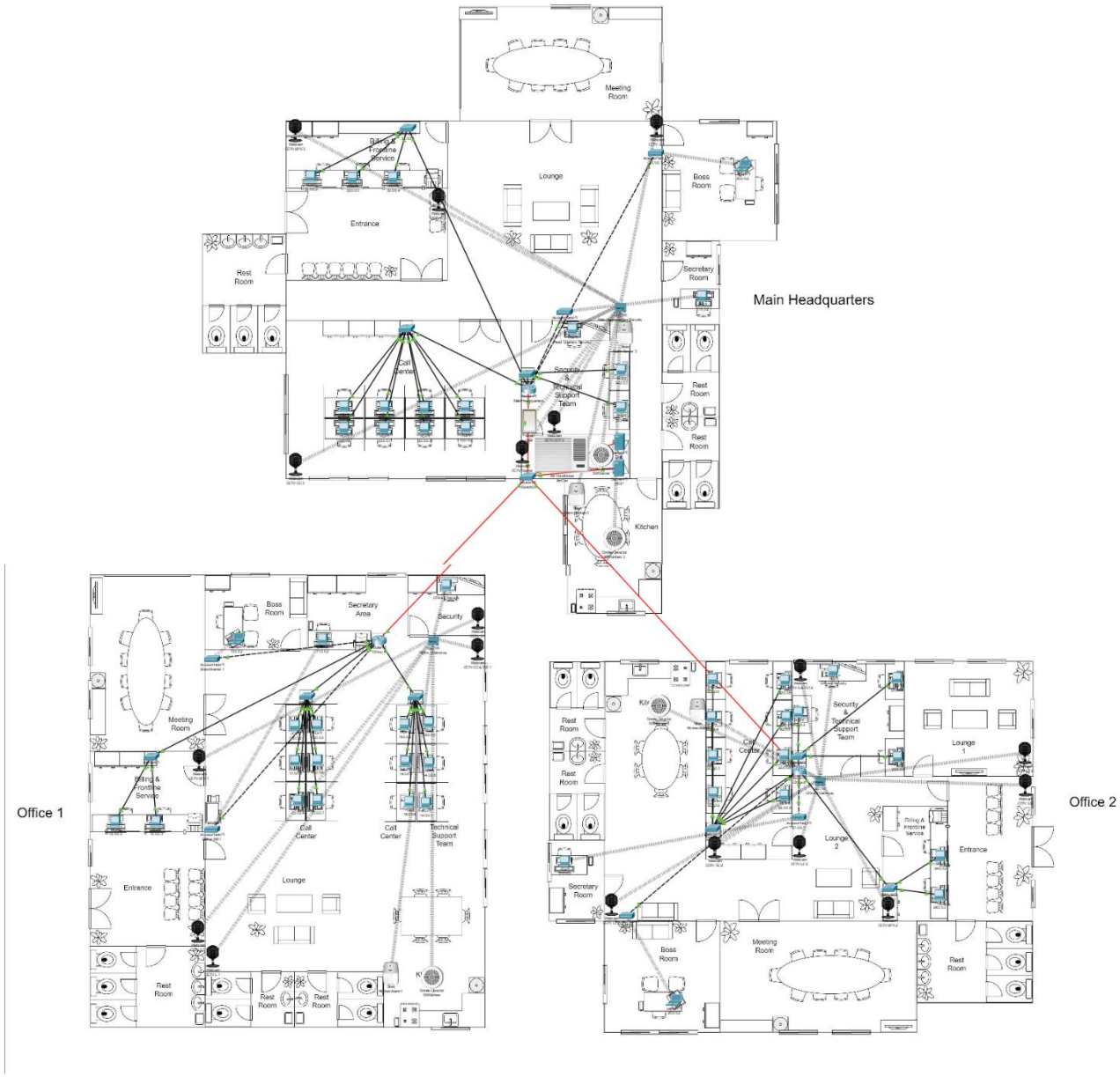
Office 1





Office 2

NETWORK FLOOR PLAN



TESTED PDUs

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	32.0.0.3	32.0.0.2	ICMP		0.813	N	0	(edit)	(delete)
	Successful	32.0.0.3	32.0.0.4	ICMP		0.825	N	1	(edit)	(delete)
	Successful	31.0.0.2	30.0.0.2	ICMP		0.836	N	2	(edit)	(delete)
	Successful	33.0.0.3	33.0.0.2	ICMP		0.000	N	3	(edit)	(delete)
	Successful	33.0.0.8	33.0.0.6	ICMP		0.000	N	4	(edit)	(delete)
	Successful	33.0.0.9	33.0.0.5	ICMP		0.000	N	5	(edit)	(delete)
	Successful	33.0.0.8	33.0.0.4	ICMP		0.000	N	6	(edit)	(delete)
	Successful	33.0.0.7	33.0.0.4	ICMP		0.000	N	7	(edit)	(delete)
	Successful	32.0.0.2	32.0.0.3	ICMP		0.000	N	8	(edit)	(delete)
	Successful	32.0.0.3	32.0.0.4	ICMP		0.000	N	9	(edit)	(delete)
	Successful	32.0.0.4	32.0.0.3	ICMP		0.000	N	10	(edit)	(delete)
	Successful	32.0.0.3	32.0.0.2	ICMP		0.000	N	11	(edit)	(delete)
	Successful	30.0.0.2	31.0.0.2	ICMP		0.000	N	12	(edit)	(delete)
	Successful	Office 1 ...	CCTV S 1	ICMP		0.000	N	13	(edit)	(delete)
	Successful	CCTV C...	Office 1 Security	ICMP		0.000	N	14	(edit)	(delete)
	Successful	CCTV B...	Office 1 Security	ICMP		0.000	N	15	(edit)	(delete)
	Successful	CCTV E 1	Office 1 Security	ICMP		0.000	N	16	(edit)	(delete)
	Successful	CCTV L 1	Office 1 Security	ICMP		0.000	N	17	(edit)	(delete)
	Successful	SM Kitc...	Office 1 Security	ICMP		0.000	N	18	(edit)	(delete)
	Successful	Kitchen ...	Office 1 Security	ICMP		0.000	N	19	(edit)	(delete)
	Successful	Office 1 ...	CCTV BFS 1	ICMP		0.000	N	20	(edit)	(delete)
	Successful	13.0.0.2	13.0.0.5	ICMP		0.000	N	21	(edit)	(delete)
	Successful	13.0.0.3	13.0.0.6	ICMP		0.000	N	22	(edit)	(delete)
	Successful	13.0.0.4	13.0.0.7	ICMP		0.000	N	23	(edit)	(delete)
	Successful	14.0.0.2	14.0.0.5	ICMP		0.000	N	24	(edit)	(delete)

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	13.0.0.4	13.0.0.7	ICMP		0.000	N	23	(edit)	(delete)
	Successful	14.0.0.2	14.0.0.5	ICMP		0.000	N	24	(edit)	(delete)
	Successful	14.0.0.3	14.0.0.6	ICMP		0.000	N	25	(edit)	(delete)
	Successful	14.0.0.4	14.0.0.7	ICMP		0.000	N	26	(edit)	(delete)
	Successful	12.0.0.2	12.0.0.3	ICMP		0.000	N	27	(edit)	(delete)
	Successful	Office 2 ...	CCTV L2 2	ICMP		0.000	N	28	(edit)	(delete)
	Successful	Office 2 ...	CCTV S & TST 2	ICMP		0.000	N	29	(edit)	(delete)
	Successful	Office 2 ...	CCTV L1 2	ICMP		0.000	N	30	(edit)	(delete)
	Successful	Office 2 ...	CCTV L2 2	ICMP		0.000	N	31	(edit)	(delete)
	Successful	CCTV B...	Office 2 Security	ICMP		0.000	N	32	(edit)	(delete)
	Successful	SM Kitc...	Office 2 Security	ICMP		0.000	N	33	(edit)	(delete)
	Successful	Kitchen ...	Office 2 Security	ICMP		0.000	N	34	(edit)	(delete)
	Successful	CCTV E 2	Office 2 Security	ICMP		0.000	N	35	(edit)	(delete)
	Successful	CCTV C...	Office 2 Security	ICMP		0.000	N	36	(edit)	(delete)
	Successful	24.0.0.2	24.0.0.3	ICMP		0.000	N	37	(edit)	(delete)
	Successful	22.0.0.4	22.0.0.5	ICMP		0.000	N	38	(edit)	(delete)
	Successful	22.0.0.3	22.0.0.2	ICMP		0.000	N	39	(edit)	(delete)
	Successful	22.0.0.7	22.0.0.6	ICMP		0.000	N	40	(edit)	(delete)
	Successful	22.0.0.9	22.0.0.8	ICMP		0.000	N	41	(edit)	(delete)
	Successful	22.0.0.4	22.0.0.7	ICMP		0.000	N	42	(edit)	(delete)
	Successful	22.0.0.6	22.0.0.5	ICMP		0.000	N	43	(edit)	(delete)
	Successful	22.0.0.2	22.0.0.9	ICMP		0.000	N	44	(edit)	(delete)
	Successful	22.0.0.3	22.0.0.7	ICMP		0.000	N	45	(edit)	(delete)
	Successful	23.0.0.4	23.0.0.2	ICMP		0.000	N	46	(edit)	(delete)
	Successful	23.0.0.5	23.0.0.2	ICMP		0.000	N	47	(edit)	(delete)

PDU List Window

Fire	Last Status	Source	Destination	Type	Color	Time(sec)	Periodic	Num	Edit	Delete
	Successful	22.0.0.7	22.0.0.6	ICMP		0.000	N	40	(edit)	(delete)
	Successful	22.0.0.9	22.0.0.8	ICMP		0.000	N	41	(edit)	(delete)
	Successful	22.0.0.4	22.0.0.7	ICMP		0.000	N	42	(edit)	(delete)
	Successful	22.0.0.6	22.0.0.5	ICMP		0.000	N	43	(edit)	(delete)
	Successful	22.0.0.2	22.0.0.9	ICMP		0.000	N	44	(edit)	(delete)
	Successful	22.0.0.3	22.0.0.7	ICMP		0.000	N	45	(edit)	(delete)
	Successful	23.0.0.4	23.0.0.2	ICMP		0.000	N	46	(edit)	(delete)
	Successful	23.0.0.5	23.0.0.2	ICMP		0.000	N	47	(edit)	(delete)
	Successful	24.0.0.2	24.0.0.3	ICMP		0.000	N	48	(edit)	(delete)
	Successful	Head Q...	CCTV STT 3	ICMP		0.000	N	49	(edit)	(delete)
	Successful	Head Q...	CCTV Server	ICMP		0.000	N	50	(edit)	(delete)
	Successful	Head Q...	SM Kitchen 3	ICMP		0.000	N	51	(edit)	(delete)
	Successful	Head Q...	Alarm Kitchen 3	ICMP		0.000	N	52	(edit)	(delete)
	Successful	CCTV S...	Head Quarters ...	ICMP		0.000	N	53	(edit)	(delete)
	Successful	CCTV C...	Head Quarters ...	ICMP		0.000	N	54	(edit)	(delete)
	Successful	CCTV E 3	Head Quarters ...	ICMP		0.000	N	55	(edit)	(delete)
	Successful	CCTV B...	Head Quarters ...	ICMP		0.000	N	56	(edit)	(delete)
	Successful	CCTV L 3	Head Quarters ...	ICMP		0.000	N	57	(edit)	(delete)
	Successful	Door	Head Quarters ...	ICMP		0.000	N	58	(edit)	(delete)
	Successful	SM Server	Head Quarters ...	ICMP		0.000	N	59	(edit)	(delete)
	Successful	AirCon	Head Quarters ...	ICMP		0.000	N	60	(edit)	(delete)
	Successful	31.0.0.2	30.0.0.2	ICMP		0.000	N	61	(edit)	(delete)
	Successful	34.0.0.4	34.0.0.3	ICMP		0.000	N	62	(edit)	(delete)
	Successful	20.0.0.2	21.0.0.2	ICMP		0.000	N	63	(edit)	(delete)
	Successful	10.0.0.2	11.0.0.2	ICMP		0.000	N	64	(edit)	(delete)