REDSCAN Event Code (R.E.C.) specifications

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Scope: REDSCAN mini series (RLS-2020I, RLS-2020S) REDSCAN series (RLS-3060, RLS-3060L, RLS-3060SH)

1. Purpose of REDSCAN Event Code

When some object or error is detected, REDSCAN sends Event Code (R.E.C.) to VMS (Video Management Software). If the VMS supports generic events and the R.E.C. meets preset strings of the generic events, the VMS triggers preset action, PTZ control of cameras for example.

2. Data Structure of R.E.C.

R.E.C. is 26 bytes ASCII code and a null byte. It includes fixed sized 11 sections. Each section is stored in fixed position. When the section has nothing to do with current alarm, space (0x20) is stored. Example:

R.E.C. when an object is detected in A1 area and master alarm is issued:

RLS126MOA1

R.E.C. when preset time (default: 10 seconds) past after the object disappeared:

RLS126CL

Section	Size (byte)	Example	Description
ID Number	6	RLS126	"RLS" and 3 bytes ID number of the REDSCAN. ID number
			can be changed.
Master Alarm	2	MO	"MO" is master alarm which means some object is detected.
			"MO" is sent again if detected area is different from
			previous detected area.
			"CL" means that preset time (default: 10 seconds) past after
			master alarm was cleared.
The Latest Area	2	A1	The latest area where the object is detected.
			Possible Code of RLS-2020 series: A1/A2/B1/B2
			Possible Code of RLS-3060 series: A1/A2/B1/B2 or
			A11/A12/A21/A22/B11/B12/B21/B22
Combination of	2	AA	The code shows multiple areas where objects are detected.
Areas			See the table below. (*1)
Multiple Areas	2	CC	"CC" means that objects are detected in multiple areas.
Disqualification	2	DQ	"DQ" means disqualification status.
			"dq" means that disqualification status is cleared.
Anti-rotation	2	AR	"AR" means that the unit is rotated.
			"ar" means that the rotation is recovered.

Table of R.E.C. Sections

Anti-masking	2	AM	"AM" means that the unit is masked.
			"am" means that the mask is recovered.
Internal Error	2	TR	"TR" means that internal error occurred.
			"tr" means that the error is recovered.
Soiling	2	SO	"SO" means that laser window has dirt.
			"so" means that the dirt is removed.
Tamper or	2	ТА	"TA" means that the cover is opened, or the unit is removed
Device			from the wall.
Monitoring			"ta" means that the trouble is recovered.
			If device monitoring is enabled, "DM" is stored in this
			section and sent repeatedly. "DM" is supported by RLS-2020
			and RLS-3060 ver. 7.3.0 or later.

"DQ", "AR", "AM", "TR", "SO", and "TA" are sent repeatedly during the trouble. The interval of sending them can be changed by "Transmission interval for Trouble code" in Fig.1.

(*1) Possible Code of Multiple Areas:

Code	B2	B1	A1	A2
AA			detected	detected
BB	detected	detected		
BA	detected			detected
Ba	detected		detected	
bA		detected		detected
ba		detected	detected	

RLS-3060 series and RLS-2020 series

"a" means A1. "A" means A2. "b" means B1. "B" means B2.

RLS-2020 series Only

Code	B2	B1	A1	A2
EA	detected	detected	detected	
Ea	detected	detected		detected
Eb	detected		detected	detected
EB		detected	detected	detected
AL	detected	detected	detected	detected

"E" means "except".

3. Protocol

Both of TCP and UDP are available simultaneously.

(1) TCP, UDP or TCP UDP and TCP

Destination IP address and port number can be changed.

I/O Settings	-	l	X
REDWALL Event Code Terminal			
Protocol			
O UDP	TCP	UDP and TCP	
Detector ID			
Use and arbitrary number	0 🔶 (0-999)		
Transmission Interval of	Trouble Code		
1 🔶 (1-3600 s	ec)		
Clear Code Timing			
10 🔶 (2-60 sec)		
Heartbeat for Device M	onitoring		
Heartbeat for Device Moni	toring		
UDP			
Scope	Broadcast	🔘 Unicast	
IP Address (Destination)			192.168.0.1
Port Number (Destination)	1234 🔿 (0-65535)		
Number of Transmission	10 🔶 (1-20)		
TCP			
IP Address (Destination)			192.168.0.1
Port Number (Destination)	1234 🚔 (0-65535)		
		Save	Cancel

Fig.1 GUI of REDSCAN Manager Advanced

4. Sequence

(1) TCP

F	.E.C.Samp	le-TCP-M	OandCL.	pcapng	[Wiresh	nark 1.1	2.8 (\	/1.12.8	-0-g5b6e	543 from	m mast	er-1.12)]	ages in	10.0			x
File	<u>E</u> dit <u>V</u> ie	ew <u>G</u> o	<u>C</u> apture	<u>A</u> nalyze	<u>S</u> tatist	ics Tele	ephony	<u>Tools</u>	<u>I</u> nterna	ls <u>H</u> elp	p						
0	•			* 2	Q	🔶 🔿	42 7	7 L] €	Q	2, 🖭 👹	¥ 💀	*	B		
Filt	er:								▼ Exp	ression	Cle	ar Apply S	Save				
No.	Time		Source			Destina	ation		Pro	tocol L	ength	Info					
	1 0.0	0000000	192.16	8.0.120	5	192.1	.68.0	. 55	TC	2	74	39569-1234	4 [SYN]	Seq=0) Win=1	L4600	Len=
	2 0.0	0027800	192.16	8.0.55		192.1	.68.0	.126	TC	2	74	1234-3956	9 [SYN,	ACK]	Seq=0	Ack=1	. Win
	3 0.0	0066600	192.16	8.0.120	5	192.1	.68.0	. 55	TC	•	66	39569-1234	4 [ACK]	Seq=1	. Ack=1	L Win=	=1460
	4 0.0	0089400	192.16	8.0.126	5	192.1	.68.0	.55	TC	2	93	39569-1234	4 [PSH,	ACK]	Seq=1	Ack=1	L Win
	5 0.0	0108400	192.16	8.0.126	5	192.1	.68.0	. 55	TC	2	66	39569-1234	4 [FIN,	ACK]	Seq=28	3 Ack=	=1 Wi
	6 0.0	0116400	192.16	8.0.55		192.1	.68.0	.126	TC	0	66	1234-3956	9 [ACK]	Seq=1	. Ack=2	29 Wir	1=665
	7 0.04	4718100	192.16	8.0.55		192.1	.68.0	.126	TC	2	66	1234+3956	9 [FIN,	ACK]	Seq=1	Ack=2	29 Wi
	8 0.04	4757800	192.16	8.0.120	5	192.1	.68.0	. 55	TC	•	66	39569-1234	4 [ACK]	Seq=2	9 Ack=	=2 Wir	1=146
	9 9.54	4933900	192.16	8.0.120	5	192.1	.68.0	. 55	TC	>	74	39570-1234	4 [SYN]	Seq=0	Win=1	L4600	Len=
	10 9.54	4961400	192.16	8.0.55		192.1	.68.0	.126	TC	>	74	1234+3957	D [SYN,	ACK]	Seq=0	Ack=1	. Win
	11 9.54	4999500	192.16	8.0.126	5	192.1	.68.0	. 55	TC	•	66	39570-1234	4 [ACK]	Seq=1	. Ack=1	L Win=	=1460
	12 9.5	5022300	192.16	8.0.126	5	192.1	.68.0	. 55	TC	•	93	39570-1234	4 [PSH,	ACK]	Seq=1	Ack=1	L Win
	13 9.5	5040500	192.16	8.0.120	5	192.1	.68.0	. 55	TC	2	66	39570-1234	4 [FIN,	ACK]	Seq=28	3 Ack=	=1 Wi
	14 9.5	5048500	192.16	8.0.55		192.1	.68.0	.126	TC	2	66	1234-3957) [ACK]	Seq=1	Ack=2	29 Wir	1=665
	15 9.5	9152900	192.16	8.0.55		192.1	.68.0	.126	TC	2	66	1234-3957	D [FIN,	ACK]	Seq=1	Ack=2	29 Wi
	16 9.5	9199700	192.16	8.0.126	5	192.1	.68.0	. 55	тс	2	66	39570-1234	4 [ACK]	Seq=2	9 Ack=	=2 Wir	n =1 46
•						111											•
+ F	rame 4:	93 byte	es on v	vire (7	44 bit	s), 93	byt	es cap	otured	(744 b	oits)	on interfa	ace O				
E E	thernet	II, Sro	c: Opte	ex_00:0	0:00 (00:1f:	d1:0	0:00:0	00), Dst	: Tos	shiba_	e7:3e:10	(b8:6b:	23:e7:	3e:10)	,	
± I	nternet	Protoco	ol Vers	sion 4,	Src:	192.16	58.0.	126 (1	92.168	0.126	5), Ds	t: 192.168	3.0.55	(192.1	68.0.5	5)	
. T	ransmiss	sion Co	ntrol F	rotoco	l, sro	Port:	395	69 (39	9569), 1	ost Po	ort: 1	234 (1234)), Seq:	1, AC	k: 1,	Len:	27
÷ 0	ata (27	bytes)															
000	0 b8 6ł	23 67	3e 10	00 1f	d1 00	00.00	08	00 45	00	# >		F					
001	0 00 4f	ab 9e	40 00	40 06	0d 05	c0 a8	00	7e c0	a8 .0			~					
002	0 00 37	9a 91	04 d2	2b 64	9a 06	eb 04	79	0c 80	18 .7	+	-d	.y					
003	0 0e 42	2 40 6b	00 00	01 01	08 0a	00 10	31	99 00	23 .E	@k		.1#					
004	$0 \frac{41}{20} \frac{78}{20}$) 20 20	20 20	20 20	20 20	20 20	00	20 20	20 A.	RES34	ADM C1	±					
	🖋 Data (d	ata), 27 by	ytes			Packet	s: 16 ·	Displaye	ed: 16 (10	0.0%)	· Load t	time: 0:00.001	Profi	e: Defau	lt		

Fig.3 Sample of TCP Sequence (R.E.C.Sample-TCP-MOandCL.pcapng)

When some alarm detected, REDSCAN connects to the destination (No.1-3), sends R.E.C. (No.4), and disconnects the TCP (No.5-8).

R.E.C.Sample-TCP-MOandCL.pcapng [Wiresh	shark 1.12.8 (v1.12.8-0-g5b6e543 from master-1.12)]
<u>F</u> ile <u>E</u> dit <u>V</u> iew <u>G</u> o <u>C</u> apture <u>A</u> nalyze <u>S</u> tatist	stics Telephony <u>T</u> ools <u>I</u> nternals <u>H</u> elp
● ● 🔌 🕷 🔏 🖻 🖺 🗙 🥭 🤇	← ⇔ → 7 ⊈ 🗐 🗐 € ♀ ♀ 🕾 🖼 ⊠ 幆 ※ 몇
Filter:	Expression Clear Apply Save
No. Time Source	Destination Protocol Length Info
1 0.00000000 192.168.0.126	192.168.0.55 TCP 74 39569→1234 [SYN] Seq=0 Win=14600 Len
2 0.00027800 192.168.0.55	192.168.0.126 TCP 74 1234→39569 [SYN, ACK] Seq=0 Ack=1 Wi
3 0.00066600 192.168.0.126	192.168.0.55 TCP 66 39569-1234 [ACK] Seq=1 Ack=1 Win=146
4 0.00089400 192.168.0.126	192.168.0.55 TCP 93 39569→1234 [PSH, ACK] Seq=1 Ack=1 Wi
5 0.00108400 192.168.0.126	192.168.0.55 TCP 66 39569+1234 [FIN, ACK] Seq=28 Ack=1 W
6 0.00116400 192.168.0.55	192.168.0.126 TCP 66.1234→39569 [ACK] Seq=1 ACK=29 W1n=66.
/ 0.04/18100 192.108.0.55	192.108.0.120 ICP 00 1234→39509 [FIN, ACK] Seq=1 ACK=29 W
8 0.04/5/800192.108.0.120	192.108.0.55 TCP 00.39509+1234 [ACK] SEq=29 ACK=2 WIR=141
9 9. 54955900 192.108.0.120	192.108.0.33 TCP 74 59370+1234 [STN] SEQ=0 WITH=14000 LEFT
11 0 54000500102 168 0 126	192.108.0.120 TCP 74.1234-39370 [STN, ACK] SEQ=0 ACK=1 WI
12 9 55022300 192 168 0 126	192.108.0.55 TCP 03.30570-1234 [ACK] Seq=1 ACK-1 Will-140
13 9 55040500 192 168 0 126	192.168.0.55 TCP 66.39570-1234 [FIN, ACK] Seq=28 Ack=1 W
14 9. 55048500 192. 168. 0. 55	192.168.0.126 TCP 66.1234→39570 [ACK] Seq=1 Ack=29 Win=66
15 9, 59152900 192, 168, 0, 55	192.168.0.126 TCP 66.1234→39570 [FTN, ACK] Seq=1 Ack=29 W
16 9.59199700 192.168.0.126	192.168.0.55 TCP 66 39570→1234 [ACK] Seq=29 Ack=2 Win=14
٠ [4
🗄 Frame 12: 93 bytes on wire (744 bi	its), 93 bytes captured (744 bits) on interface 0
	(00:1f:d1:00:00:00), Dst: Toshiba_e7:3e:10 (b8:6b:23:e7:3e:10)
⊞ Internet Protocol Version 4, Src:	192.168.0.126 (192.168.0.126), Dst: 192.168.0.55 (192.168.0.55)
🗄 Transmission Control Protocol, Src	c Port: 39570 (39570), Dst Port: 1234 (1234), Seq: 1, Ack: 1, Len: 27
🗄 Data (27 bytes)	
0000 b8 6b 23 e7 3e 10 00 1f d1 00	
0010 00 4f 7b cc 40 00 40 06 3c d7	$7 \text{ co as } 00 7e \text{ co as } .0\{.@.@. <~$
0020 00 37 9a 92 04 d2 45 8b 4e 9f	f bd ea c1 87 80 18 .7E. N
0030 0e 42 79 e7 00 00 01 01 08 0a	a 00 1d 35 54 00 23 .By 5T.#
0040 43 03 52 42 53 53 54 35 43 42 0050 20	0 20 20 20 20 20 20 E. RLS343 CL
🔵 📝 Data (data), 27 bytes	Packets: 16 · Displayed: 16 (100.0%) · Load time: 0:00.001 Profile: Default

Fig.4 Sample of TCP Sequence (continue)

When the alarm is cleared, REDSCAN waits for "Transmission Interval for Clear code" (Fig.1), connects to the destination (No.9-11), sends R.E.C. (No.12), and disconnects the TCP (No.13-16).

(2)	UDP

📕 R	.E.C.S	ample-	UDP-I	MOandCL	.pcapng	[Wires	hark 1.	12.8 ((v1.12.8-	0-g5b6e54	3 from mas	ster-1.12)]			×
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>G</u> o	<u>C</u> apture	<u>A</u> nalyze	<u>S</u> tatist	ics Te	lephon	<u>y T</u> ools	<u>I</u> nternals	<u>H</u> elp					
0	•		Ø		🗙 🔁	Q	🗢 🔿	ٰ 💫	₮ 👱		€. €. (0, 🖭	M 🖂	10 👫		
Filte	er:									▼ Expres	sion Cle	ar Appl	y Save			
No.	٦	Time		Source			Destin	nation		Protoc	ol Length	Info				*
	1 (0.000	0000)192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	2 (0.0000	07500)192.16	8.0.126		192.	168.0).55	UDP	69	Source	port:	57238	Destination	por
	3 (0.0001	.0500)192.16	8.0.126		192.	168.0	.55	UDP	60	Source	port:	57238	Destination	por
	4 (0.0001	.2700)192.16	8.0.126		192.	168.0	.55	UDP	60	Source	port:	57238	Destination	por
	5 (0.0001	.7100)192.16	8.0.126		192.	168.0	.55	UDP	69	Source	port:	57238	Destination	por
	6 (0.0001	.9400)192.16	8.0.126		192.	168.0	.55	UDP	60	Source	port:	57238	Destination	por
	7 (0.0002	23200)192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	8 (0.0002	25300) 192.16	8.0.126		192.	168.0	. 55	UDP	69	Source	port:	57238	Destination	por =
	9 (0.0002	9000) 192.16	8.0.126		192.	168.0	. 55	UDP	60	source	port:	5/238	Destination	por
	10 (0.0003	51100	192.10	8.0.126		192.	168.0		UDP	60	Source	port:	5/238	Destination	por
	12 (0.0003	510C	102.10	8.0.120		102	168.0		UDP	69	Source	port:	57238	Destination	por
	12 (0.0003	0000	102.10	0.0.120		102	168.0		UDP	60	Source	port:	57250	Destination	por
	14 (0.0004	12200	102.10	0.0.120		102	168.0	. 55	UDP	60	Source	port:	57328	Destination	por
-	15 (0.0004	6700	102.10	8 0 126		102	168 0		UDP	60	Source	port:	57238	Destination	por
	16 (0.0004	8800	102.10	8 0 126		102	168 0			60	Source	port:	57238	Destination	por
	17 (0.0004	2900) 192.10	8 0 126		192	168 0	55	UDP	69	Source	port:	57238	Destination	por
	18 (0.0005	1 900	102.10	8 0 126		102	168 0	55		60	Source	port:	57238	Destination	por
	19 (0,0005	8600) 192.10	8 0 126		192	168 0	55	UDP	60	Source	port:	57238	Destination	por
	20 0	0.0006	50700) 192.16	8.0.126		192	168.0	. 55	UDP	69	Source	port:	57238	Destination	por
	21 (0.0006	54400) 192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	22 (0.0006	56500) 192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	23 (0.0007	0600) 192.16	8.0.126		192.	168.0	. 55	UDP	69	Source	port:	57238	Destination	por
	24 (0.0007	2700) 192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	25 (0.0007	6300) 192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	26 (0.0007	8400)192.16	8.0.126		192.	168.0	. 55	UDP	69	Source	port:	57238	Destination	por
	27 (0.0008	32300)192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	28 (0.0008	34400)192.16	8.0.126		192.	168.0	. 55	UDP	60	Source	port:	57238	Destination	por
	29 (0.0008	8200)192.16	8.0.126		192.	168.0	. 55	UDP	69	Source	port:	57238	Destination	por
	30 (0.0009	90500)192.16	8.0.126		192.	168.0	.55	UDP	60	Source	port:	57238	Destination	por
	31 3	10.283	32420)192.16	8.0.126		192.	168.0	.55	UDP	60	Source	port:	57238	Destination	por 🖕
4	22.5	10 202	24050	1107 16	Q A 176		102	160 0	55	LIDD	60	Sourco	port.	57000	Dectination	- nor
							····						_	_		
⊕ F	rame	2: 69) byt	es on v	vire (55	2 bit	s), 6	9 byt	es cap	tured (5	52 bits)	on inte	erface	0		
+ E	ther	net II	., sr	c: opte	ex_00:00	:00 (00:17	:d1:0	0:00:0	0), Dst:	Toshiba_	_e/:3e:1	10 (68:	60:23:0	e/:3e:10)	
I III	nteri	net Pr	otoc	ol vers	510n 4,	src:	192.1	68.0.	126 (1	92.168.0.	126), DS	5 t: 192.	.168.0.	55 (19)	2.168.0.55)	
	ser i	Jatagr	am P	rotocol	I, SEC P	ort:	5/238	(5/2	(38), D	st Port:	1234 (14	234)				
E D	ala	(27 by	rces)													
000	0 b8	3 6b 2	3 e7	3e 10	00 1f	d1 00	00 0	0 08	00 45	00 .k#	>	E.				
001	õ õ	37 0	õ õ	40 00	40 11	b8 b0	c0 a	8 00	7e c0	a8 .7	@.@	~				
002	0 00) 37 d	f 96	04 d2	00 23	30 03	52 4	c 53	33 34	35 .7	# 0.	RL5345				
003	0 40	1 4T 4	I 31	20 20	20 20	20 20	20 2	0 20	20 20	ZU MOAI						
004		. 20 2	0 20	-00										-		
	🖉 Dat	a (data)), 27 t	oytes			Packe	ts: 60	 Displaye 	d: 60 (100.0	%) · Load	time: 0:00	.002	Profile: De	afault	

Fig.5 Sample of UDP Sequence (R.E.C.Sample-UDP-MOandCL.pcapng)

When some alarm detected, REDSCAN sends a series of 3 UDP packets to the destination (No.1-3). Second packet contains R.E.C. (No.2). According to "Number of Transmission" (Fig.2), REDSCAN repeats sending the series of 3 packets. (No.1 - No.30)

F	R.E.C.S	Sample-	UDP-N	4OandCL	.pcapng	[Wires	hark 1	.12.8	(v1.12	2.8-0-g5b	e543 fr	rom mas	ster-1.12))]			x
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>G</u> o	<u>Capture</u>	<u>A</u> nalyze	<u>S</u> tatist	tics Te	elephon	i <u>y T</u> o	ols <u>I</u> nter	als <u>H</u> e	elp					
0	0				* 2	Q	🔶 📦) 🤣	₹ 1		3 C		Q 🖭	¥ ¥	R %	ġ	
Filt	er:									▼ E	pressio	n Cle	ear Appl	y Save	2		
No.	-	Time		Source			Desti	nation		P	otocol	Length	Info				-
	30	0.0009	0500	192.16	8.0.126		192.	168.0), 55)P	60	Source	port:	57238	Destination	por
	31	10.283	32420	192.16	8.0.126		192.	168.0). 55	U	DP	60	Source	port:	57238	Destination	por
	32	10.283	34050	192.16	8.0.126		192.	168.0).55	U	OP	69	Source	port:	57238	Destination	por
	33	10.283	35200	192.16	8.0.126		192.	168.0).55	U	OP	60	Source	port:	57238	Destination	por
	34	10.283	85710	192.16	8.0.126		192.	168.0).55	U	OP	60	Source	port:	57238	Destination	por
	35	10.283	36130	192.16	8.0.126		192.	168.0).55	U	OP	69	Source	port:	57238	Destination	por
	36	10.283	36460	192.16	8.0.126		192.	168.0).55	U	OP	60	Source	port:	57238	Destination	por
	37	10.283	36760	192.16	8.0.126		192.	168.0).55	U	OP	60	Source	port:	57238	Destination	por
	38	10.283	37080	192.16	8.0.126		192.	168.0).55	U	OP	69	Source	port:	57238	Destination	por
	39	10.283	37390	192.16	8.0.126		192.	168.0).55	U	OP	60	Source	port:	57238	Destination	por
	40	10.283	37720	192.16	8.0.126		192.	168.0).55	U	OP	60	Source	port:	57238	Destination	por
	41	10.283	8030	192.16	8.0.126		192.	168.0).55	U	OP	69	Source	port:	57238	Destination	por
	42	10.283	38390	192.16	8.0.126		192.	168.0). 55	U	OP	60	Source	port:	5/238	Destination	por
	43	10.284	10330	192.10	8.0.126		192.	168.0). 55	U	9P	60	Source	port:	5/238	Destination	por
-	44	10.284	1200	192.10	8.0.126		192.	168.0). 55	U	96	69	Source	port:	5/238	Destination	por
	45	10.284	1200	102.10	08.0.126		192.	168.0). 55	U	90	60	Source	port:	5/238	Destination	por
	40	10.284	12210	102.10	0.0.120		192.	168.0). 33	U		60	Source	port:	57238	Destination	por
-	47	10.284	2210	102.10	0.0.120		192.	160.0).))) 55	0		60	Source	port:	57330	Destination	por
_	40	10.284	12230	102.10	0.0.120		192.	169.0). 33			60	Source	port:	57320	Destination	por
	50	10.204	12150	102.10	0.0.120		102	160.0). 55		קר סר	60	Source	port.	57320	Destination	por
-	51	10.204	13220	102.10	8 0 126		102	168 0) 55		קר קר	60	Source	port.	57238	Destination	por
	52	10.284	14080	102.10	8 0 126		102	168 0) 55		קר קר	60	Source	port.	57238	Destination	por =
	53	10.284	4000	192.10	8 0 126		192.	168 0) 55		קר קר	69	Source	port.	57238	Destination	por
	54	10 284	4760	192.16	8 0 126		192	168 0) 55		יג פר	60	Source	port.	57238	Destination	por
	55	10.284	5060	192.16	8.0.126		192.	168.0). 55)P	60	Source	port:	57238	Destination	por
	56	10.284	5370	192.16	8.0.126		192.	168.0). 55	U)P	69	Source	port:	57238	Destination	por
-	57	10.284	5680	192.16	8.0.126		192.	168.0), 55	Ū	DP	60	Source	port:	57238	Destination	por
	58	10.284	6050	192.16	8.0.126		192.	168.0). 55	U	DP	60	Source	port:	57238	Destination	por
	59	10.284	7880	192.16	8.0.126		192.	168.0). 55	U	OP	69	Source	port:	57238	Destination	por
	60	10.284	8760	192.16	8.0.126		192.	168.0). 55	U	OP	60	Source	port:	57238	Destination	por -
																	•
		22.6	0 hv	tos on	wino (S	50 hi	(+c)	60 h	tor	conturo	1 (557	(hitc)	on in	torfac			
	thor	DOT TT	ie Dy Cr	c: Opt			(00·1f	09 Dy Erd1 r/	00.00	(Capture	н (род .+. та	c Dits)	011 11	10 (hg	e U •66•72•	07:20:10)	
	inter	net Dr	otor	ol Ver	tion 4	Src.	102 1	68 0	126	(102 16	2 0 17	26) De	+ 107	168 0	55 (10	2 168 0 55)	
	Iser I	Dataor	am P	rotoco	l Src P	ort.	57238	2 (57)	238)	Dst Po	$++ \cdot 17$	234 (17)	234)	.100.0		2.100.0.55)	
)ata	(27 by)	tes)	. 00000	i, sie r	5111.	5,250		,	052 20	12						
		(2. Jy	200)														
000	0 bi	8 6b 2	3 e7	3e 10	00 1f	d1 00	00 0	0 08	00 4	5 00	k#.>.		E.				
001	0 0	0 37 0	0 00	40 00	40 11	b8 b0) <u>c0</u> a	8 00	7e c	0 a8	7@.	@	~				
002	0 0	0 37 d	T 96	04 d2	20 20	5b 17	52 4	C 53	33 3	4 35	7	.# [.R	RE5345				
004	0 2	0 20 2	0 20	00	20 20	20 20	20 2	.0 20	20 2	0.20							
0	🖉 Dat	ta (data)), 27 b	ytes			Packe	ets: 60	• Displa	ayed: 60 (:	00.0%)	• Load	time: 0:00	0.002	Profile: D	efault	

Fig.6 Sample of UDP Sequence (continue)

When the alarm is cleared, REDSCAN waits for "Transmission Interval for Clear code" (Fig.2). Then, REDSCAN sends a series of 3 UDP packets to the destination (No.31-33). Second packet contains R.E.C. (No.32). According to "Number of Transmission" (Fig.2), REDSCAN repeats sending the series of 3 packets. (No.31-No.60)

5. Packet Structure

(1) When R.E.C. is sent via TCP:

27 bytes R.E.C. code is stored in TCP payload.

R.E.C.Sample-TCP-MOandCL.pcapng [Wireshark 1.12.8 (v1.12.8-	D-g5b6e543 from master-1.12)]
<u>File Edit View Go Capture Analyze Statistics Telephony Tools</u>	Internals <u>H</u> elp
▣ ◎ 煮 ■ 🙇 🖻 🖺 🗙 🔁 <, 수 🌳 🖓 🏆 👱	EF 0, 0, 0, 10 ¥ 12 畅 💥 🕱
Filter:	Expression Clear Apply Save
No. Time Source Destination	Protocol Length Info
1 0.0000000 192.168.0.126 192.168.0.55	TCP 74 39569→1234 [SYN] Seq=0 Win=14600 L€
2 0.00027800 192.168.0.55 192.168.0.126	TCP 74 1234→39569 [SYN, ACK] Seq=0 Ack=1 V
3 0.00066600 192.168.0.126 192.168.0.55	TCP 66 39569→1234 [ACK] Seq=1 Ack=1 Win=14
4 0.00089400 192.168.0.126 192.168.0.55	TCP 93 39569→1234 [PSH, ACK] Seq=1 Ack=1 W -
۲. III III III III III III III III III I	Þ
	tured (744 bits) on interface 0
	0), Dst: Toshiba_e7:3e:10 (b8:6b:23:e7:3e:10)
	92.168.0.126), Dst: 192.168.0.55 (192.168.0.55)
田 Transmission Control Protocol, Src Port: 39569 (39)	569), Dst Port: 1234 (1234), Seq: 1, Ack: 1, Len: 27
∎ Data (27 bytes)	
0000 b8 6b 23 e7 3e 10 00 1f d1 00 00 00 08 00 45 (00 .k#.>E.
0010 00 4f ab 9e 40 00 40 06 0d 05 c0 a8 00 7e c0 a	a8 .0@.@~
0020 00 37 9a 91 04 d2 2b 64 9a 06 eb 04 79 0c 80 1	18 .7+dy
0030 0e 42 40 60 00 00 01 01 08 0a 00 1d 31 99 00 2	23 .B@K1# 20 A PLS345 MOA1
0050 20 20 20 20 20 20 20 20 20 20 20 20 20	A. REDDAD MOAL
Data (data), 27 bytes Packets: 16 · Displayed	d: 16 (100.0%) · Load time: 0:00.000 Profile: Default

Fig.7 R.E.C. in TCP Payload

(2) When R.E.C. is sent via UDP:

REDSCAN sends a series of 3 UDP packets to the destination. The first packet contains 8 bytes header which starts from "URG.GC". The second packet contains R.E.C. The third packet contains 2 bytes checksum.

R	.E.C.Sa	mple-U	JDP-N	10anc	ICL.p	capng	[Wi	iresha	ark 1	.12.8	(v1	.12	. <mark>8-0-</mark> 9	35b6e5	i43 fro	m m	naste	r-1.12)]					X	3
<u>F</u> ile	<u>E</u> dit	<u>V</u> iew	<u>G</u> o	<u>C</u> aptu	ire <u>/</u>	<u>A</u> nalyze	<u>S</u> ta	atistic	а Т	elepho	on <u>y</u>	Too	ols <u>I</u>	nternal	<u>H</u> elp)									
0	•					X 2		2		> 🎝		_₽			⊕	Q	•	++	M.	Y	1 5		ġ		
Filte	er:												•	Expr	ession	(Clear	Арр	ly Sa	ive					
No.	т	ime		Sourc	e			[Dest	inatio	n			Prot	col L	.engt	th In	fo							~
	1 0	.0000	0000	192.	168	0.120	5		192	.168	. 0. 5	5		UDP		(60 S	ource	port	t:	57238	De	stination	n por	r 🖳
	2 0	.0000	7500	192.	168	0.120	5		192	.168	.0.5	5		UDP		(69 S	ource	port	t:	57238	De	estination	n por	r
	3 0	.0001	0500	192.	168	.0.120	5		192	.168	.0.5	i5		UDP		(60 S	ource	port	t:	57238	De	estination	n por	r +
٠ [•	
E F	rame	1: 60	byt	es o	n wi	re (4	80 I	bits),	60 b	ytes	s ca	aptu	red (480 b	its	;) or	ı int	erfa	e	0				
÷Ε	thern	et II	, Sr	c: 0	ptex	_00:0	0:00	0 (0	0:1	f:d1	:00:	:00	:00)	, Dst	: Tos	hib	oa_e7	7:3e:	10 (ł	o8:	6b:23:	e7:	3e:10)		
÷Ι	ntern	et Pr	otoc	ol V	ersi	on 4,	Sno	c: 1	92.	168.	0.12	26 ((192	.168.	0.126	j),	Dst	: 192	.168.	0.	55 (19	2.1	.68.0.55)		
÷υ	ser D	atagr	am P	roto	col,	Snc	Port	t: 5	723	8 (5)	7238	3),	Dst	Port	: 123	34 ((1234	4)							
⊞ D	ata (8 byt	es)																						
000	0 b8	6b 2	3 e7	3e 1	10 0	0 1f	d1	00	00	00 0	8 00) 45	5 00	.k	#. >			.E.							
001	0 00	24 0	00	40 (00 4	0 11	b8	c 3	c0	a8 0(0 7e	2 C() a8	.\$	@.@	ι		~							
002	0 00	37 di	96	04 0	d2 0	0 10	b5	ae	55	52 47	7 00) 47	743	.7	• • • • •	• •	.URC	i.GC							
1003	00		00	00 (0 0	0 00	00	00	00	00					• • • • •	• •	•••								
0 🖢	Data	(data)	8 by	tes					Pack	ets: 6	0 · D	isplay	yed: 6	50 (100	.0%)	• Loa	ad tim	ie: 0:0	0.001		Profile: D	efau	lt		

Fig.8 Header in the first UDP Packet

R.E.C.Sample-UDP-MOandCL.pcapng [Wireshark 1.12.8 (v1.12.8-0-g5b6e543 from master-1.12)]								x
<u>File</u> dit	<u>V</u> iew <u>G</u> o <u>C</u> apt	ure <u>A</u> nalyze <u>s</u>	<u>S</u> tatistics Telephon <u>y</u>	<u>T</u> ools <u>I</u> nternals	<u>H</u> elp			
▣ ◉ ∡ ■ ゑ ⊨ 🗎 X ᢓ ᆃ ᆃ ⊋ 7 ½ ⊟ 🖃 ੯ ੨ ሢ 🖻 ¥ ⊠ 🗞 % 🛱								
Filter: Expression Clear Apply Save								
No. Tir	ne Sour	rce	Destination	Protoc	ol Length Info			~
1 0.	0000000 192	.168.0.126	192.168.0.	. 55 UDP	60 Source	port: 57238	Destination	por
2 0.	00007500192	.168.0.126	192.168.0.	. 55 UDP	69 Source	port: 57238	Destination	por
3 0.	00010500 192	.168.0.126	192.168.0.	.55 UDP	60 Source	port: 57238	Destination	por 👻
۰ ۲								P.
🗄 Frame 2: 69 bytes on wire (552 bits), 69 bytes captured (552 bits) on interface 0								
∃ Internet Protocol Version 4, Src: 192.168.0.126 (192.168.0.126), Dst: 192.168.0.55 (192.168.0.55)								
🗄 User Datagram Protocol, Src Port: 57238 (57238), Dst Port: 1234 (1234)								
I Data (2/ bytes)								
0000 b8	6b 23 e7 3e	10 00 1f d	1 00 00 00 08 0	00 45 00 .k#.	>E.			
0010 00	37 00 00 40	00 40 11 b	08 b0 c0 a8 00 7	7ec0a8.7	@.@ <u>~</u>			
0020 00	37 df 96 04	d2 00 23 3	30 03 52 4c 53 3	33 34 35 .7	# 0.RLS345			
0040 20	20 20 20 00	20 20 20 2	.0 20 20 20 20 20 2	20 20 20 MOAI				
○ M Data (data), 27 bytes Packets: 60 · Displayed: 60 (100.0%) · Load time: 0:00.001 Profile: Default								





Fig.10 Checksum in the third UDP Packet

6. Sample Packets

Sample Files captured by WireShark are provided.

- R.E.C. Sample-TCP-MO and CL. pc apng
- $R.E.C. Sample {\ } TCP {\ } Multiple. pcapng$
- $R.E.C. Sample \hbox{-} TCP \hbox{-} TA and ta.pc apng$
- $R.E.C. Sample {\ }UDP {\ }MO and CL. pcapng$
- $R.E.C. Sample {\ } UDP {\ } Multiple. pcapng$
- $R.E.C. Sample {\ } UDP {\ } TA and ta. pc apng$