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Test Vectors for the Stream Cipher RC4

Abstract

This document contains test vectors for the stream cipher RC4.

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1. Introduction

The RC4 [RC4] algorithm is a widely used stream cipher. Test vectors for algorithms are useful for implementers. The RC4 cipher can use different key lengths. Advances in crypto-analysis [FMcG] [MANTIN01] [MIRONOV] [MANTIN05] suggest that initial parts of the stream output need to be discarded. This document contains several test vectors for different key lengths and for different offsets in the stream.

Motivation for this document arose from the implementation of [RFC4345].

The test vectors provided in this document have been collected by generating RC4 keystream output from three separate implementations and comparing the streams. The RC4 implementations used are Libgcrypt 1.4.4 [LIBGCRYPT], Nettle 2.0 [NETTLE], and a custom implementation.

The document contains test vectors for two different keys:

Key 1: The key byte index (starting on one), that is: 0x01, 0x02, 0x03, 0x04,...

Key 2: Generated by hashing the string "Internet Engineering Task Force" with the SHA-256 [SHS] [RFC4634] hash function, using the following command:

```
$ echo -n "Internet Engineering Task Force" | sha256sum
1ada31d5cf688221c109163908ebe51debb46227c6cc8b37641910833222772a
```

The generated string has also been verified using the SHA-256 hash function implementation in OpenSSL (versions 0.9.81 and 1.0.0a) [OPENSSL].

The digest that is generated is then truncated to the appropriate length, keeping the Least Significant Bit (LSB) part of the digest as the key.

The key lengths used in this document are 40, 56, 64, 80, 128, 192, and 256 bits, respectively. The stream offsets used in this document are 0, 256, 512, 768, 1024, 1536, 2048, 3072, and 4096 bytes, respectively. Offset 1536 corresponds to recommendations in [RFC4345]. The offsets 768 and 3072 correspond to recommendations in [SANS].

2. Test Vectors for RC4

Key length: 40 bits.

key: 0x0102030405

DEC	0	HEX	0:	b2 39 63 05	f0 3d c0 27	cc c3 52 4a	0a 11 18 a8
DEC	16	HEX	10:	69 82 94 4f	18 fc 82 d5	89 c4 03 a4	7a 0d 09 19
DEC	240	HEX	f0:	28 cb 11 32	c9 6c e2 86	42 1d ca ad	b8 b6 9e ae
DEC	256	HEX	100:	1c fc f6 2b	03 ed db 64	1d 77 df cf	7f 8d 8c 93
DEC	496	HEX	1f0:	42 b7 d0 cd	d9 18 a8 a3	3d d5 17 81	c8 1f 40 41
DEC	512	HEX	200:	64 59 84 44	32 a7 da 92	3c fb 3e b4	98 06 61 f6
DEC	752	HEX	2f0:	ec 10 32 7b	de 2b ee fd	18 f9 27 76	80 45 7e 22
DEC	768	HEX	300:	eb 62 63 8d	4f 0b a1 fe	9f ca 20 e0	5b f8 ff 2b
DEC	1008	HEX	3f0:	45 12 90 48	e6 a0 ed 0b	56 b4 90 33	8f 07 8d a5
DEC	1024	HEX	400:	30 ab bc c7	c2 0b 01 60	9f 23 ee 2d	5f 6b b7 df
DEC	1520	HEX	5f0:	32 94 f7 44	d8 f9 79 05	07 e7 0f 62	e5 bb ce ea
DEC	1536	HEX	600:	d8 72 9d b4	18 82 25 9b	ee 4f 82 53	25 f5 a1 30
DEC	2032	HEX	7f0:	1e b1 4a 0c	13 b3 bf 47	fa 2a 0b a9	3a d4 5b 8b
DEC	2048	HEX	800:	cc 58 2f 8b	a9 f2 65 e2	b1 be 91 12	e9 75 d2 d7
DEC	3056	HEX	bf0:	f2 e3 0f 9b	d1 02 ec bf	75 aa ad e9	bc 35 c4 3c
DEC	3072	HEX	c00:	ec 0e 11 c4	79 dc 32 9d	c8 da 79 68	fe 96 56 81
DEC	4080	HEX	ff0:	06 83 26 a2	11 84 16 d2	1f 9d 04 b2	cd 1c a0 50
DEC	4096	HEX	1000:	ff 25 b5 89	95 99 67 07	e5 1f bd f0	8b 34 d8 75

Key length: 56 bits.
key: 0x01020304050607

DEC	0	HEX	0:	29	3f	02	d4	7f	37	c9	b6	33	f2	af	52	85	fe	b4	6b
DEC	16	HEX	10:	e6	20	f1	39	0d	19	bd	84	e2	e0	fd	75	20	31	af	c1
DEC	240	HEX	f0:	91	4f	02	53	1c	92	18	81	0d	f6	0f	67	e3	38	15	4c
DEC	256	HEX	100:	d0	fd	b5	83	07	3c	e8	5a	b8	39	17	74	0e	c0	11	d5
DEC	496	HEX	1f0:	75	f8	14	11	e8	71	cf	fa	70	b9	0c	74	c5	92	e4	54
DEC	512	HEX	200:	0b	b8	72	02	93	8d	ad	60	9e	87	a5	a1	b0	79	e5	e4
DEC	752	HEX	2f0:	c2	91	12	46	b6	12	e7	e7	b9	03	df	ed	a1	da	d8	66
DEC	768	HEX	300:	32	82	8f	91	50	2b	62	91	36	8d	e8	08	1d	e3	6f	c2
DEC	1008	HEX	3f0:	f3	b9	a7	e3	b2	97	bf	9a	d8	04	51	2f	90	63	ef	f1
DEC	1024	HEX	400:	8e	cb	67	a9	ba	1f	55	a5	a0	67	e2	b0	26	a3	67	6f
DEC	1520	HEX	5f0:	d2	aa	90	2b	d4	2d	0d	7c	fd	34	0c	d4	58	10	52	9f
DEC	1536	HEX	600:	78	b2	72	c9	6e	42	ea	b4	c6	0b	d9	14	e3	9d	06	e3
DEC	2032	HEX	7f0:	f4	33	2f	d3	1a	07	93	96	ee	3c	ee	3f	2a	4f	f0	49
DEC	2048	HEX	800:	05	45	97	81	d4	1f	da	7f	30	c1	be	7e	12	46	c6	23
DEC	3056	HEX	bf0:	ad	fd	38	68	b8	e5	14	85	d5	e6	10	01	7e	3d	d6	09
DEC	3072	HEX	c00:	ad	26	58	1c	0c	5b	e4	5f	4c	ea	01	db	2f	38	05	d5
DEC	4080	HEX	ff0:	f3	17	2c	ef	fc	3b	3d	99	7c	85	cc	d5	af	1a	95	0c
DEC	4096	HEX	1000:	e7	4b	0b	97	31	22	7f	d3	7c	0e	c0	8a	47	dd	d8	b8

Key length: 64 bits.
key: 0x0102030405060708

DEC	0	HEX	0:	97	ab	8a	1b	f0	af	b9	61	32	f2	f6	72	58	da	15	a8
DEC	16	HEX	10:	82	63	ef	db	45	c4	a1	86	84	ef	87	e6	b1	9e	5b	09
DEC	240	HEX	f0:	96	36	eb	c9	84	19	26	f4	f7	d1	f3	62	bd	df	6e	18
DEC	256	HEX	100:	d0	a9	90	ff	2c	05	fe	f5	b9	03	73	c9	ff	4b	87	0a
DEC	496	HEX	1f0:	73	23	9f	1d	b7	f4	1d	80	b6	43	c0	c5	25	18	ec	63
DEC	512	HEX	200:	16	3b	31	99	23	a6	bd	b4	52	7c	62	61	26	70	3c	0f
DEC	752	HEX	2f0:	49	d6	c8	af	0f	97	14	4a	87	df	21	d9	14	72	f9	66
DEC	768	HEX	300:	44	17	3a	10	3b	66	16	c5	d5	ad	1c	ee	40	c8	63	d0
DEC	1008	HEX	3f0:	27	3c	9c	4b	27	f3	22	e4	e7	16	ef	53	a4	7d	e7	a4
DEC	1024	HEX	400:	c6	d0	e7	b2	26	25	9f	a9	02	34	90	b2	61	67	ad	1d
DEC	1520	HEX	5f0:	1f	e8	98	67	13	f0	7c	3d	9a	e1	c1	63	ff	8c	f9	d3
DEC	1536	HEX	600:	83	69	e1	a9	65	61	0b	e8	87	fb	d0	c7	91	62	aa	fb
DEC	2032	HEX	7f0:	0a	01	27	ab	b4	44	84	b9	fb	ef	5a	bc	ae	1b	57	9f
DEC	2048	HEX	800:	c2	cd	ad	c6	40	2e	8e	e8	66	e1	f3	7b	db	47	e4	2c
DEC	3056	HEX	bf0:	26	b5	1e	a3	7d	f8	e1	d6	f7	6f	c3	b6	6a	74	29	b3
DEC	3072	HEX	c00:	bc	76	83	20	5d	4f	44	3d	c1	f2	9d	da	33	15	c8	7b
DEC	4080	HEX	ff0:	d5	fa	5a	34	69	d2	9a	aa	f8	3d	23	58	9d	b8	c8	5b
DEC	4096	HEX	1000:	3f	b4	6e	2c	8f	0f	06	8e	dc	e8	cd	cd	7d	fc	58	62

Key length: 80 bits.

key: 0x0102030405060708090a

DEC	0	HEX	0:	ed e3 b0 46	43 e5 86 cc	90 7d c2 18	51 70 99 02
DEC	16	HEX	10:	03 51 6b a7	8f 41 3b eb	22 3a a5 d4	d2 df 67 11
DEC	240	HEX	f0:	3c fd 6c b5	8e e0 fd de	64 01 76 ad	00 00 04 4d
DEC	256	HEX	100:	48 53 2b 21	fb 60 79 c9	11 4c 0f fd	9c 04 a1 ad
DEC	496	HEX	1f0:	3e 8c ea 98	01 71 09 97	90 84 b1 ef	92 f9 9d 86
DEC	512	HEX	200:	e2 0f b4 9b	db 33 7e e4	8b 8d 8d c0	f4 af ef fe
DEC	752	HEX	2f0:	5c 25 21 ea	cd 79 66 f1	5e 05 65 44	be a0 d3 15
DEC	768	HEX	300:	e0 67 a7 03	19 31 a2 46	a6 c3 87 5d	2f 67 8a cb
DEC	1008	HEX	3f0:	a6 4f 70 af	88 ae 56 b6	f8 75 81 c0	e2 3e 6b 08
DEC	1024	HEX	400:	f4 49 03 1d	e3 12 81 4e	c6 f3 19 29	1f 4a 05 16
DEC	1520	HEX	5f0:	bd ae 85 92	4b 3c b1 d0	a2 e3 3a 30	c6 d7 95 99
DEC	1536	HEX	600:	8a 0f ed db	ac 86 5a 09	bc d1 27 fb	56 2e d6 0a
DEC	2032	HEX	7f0:	b5 5a 0a 5b	51 a1 2a 8b	e3 48 99 c3	e0 47 51 1a
DEC	2048	HEX	800:	d9 a0 9c ea	3c e7 5f e3	96 98 07 03	17 a7 13 39
DEC	3056	HEX	bf0:	55 22 25 ed	11 77 f4 45	84 ac 8c fa	6c 4e b5 fc
DEC	3072	HEX	c00:	7e 82 cb ab	fc 95 38 1b	08 09 98 44	21 29 c2 f8
DEC	4080	HEX	ff0:	1f 13 5e d1	4c e6 0a 91	36 9d 23 22	be f2 5e 3c
DEC	4096	HEX	1000:	08 b6 be 45	12 4a 43 e2	eb 77 95 3f	84 dc 85 53

Key length: 128 bits.

key: 0x0102030405060708090a0b0c0d0e0f10

DEC	0	HEX	0:	9a c7 cc 9a	60 9d 1e f7	b2 93 28 99	cd e4 1b 97
DEC	16	HEX	10:	52 48 c4 95	90 14 12 6a	6e 8a 84 f1	1d 1a 9e 1c
DEC	240	HEX	f0:	06 59 02 e4	b6 20 f6 cc	36 c8 58 9f	66 43 2f 2b
DEC	256	HEX	100:	d3 9d 56 6b	c6 bc e3 01	07 68 15 15	49 f3 87 3f
DEC	496	HEX	1f0:	b6 d1 e6 c4	a5 e4 77 1c	ad 79 53 8d	f2 95 fb 11
DEC	512	HEX	200:	c6 8c 1d 5c	55 9a 97 41	23 df 1d bc	52 a4 3b 89
DEC	752	HEX	2f0:	c5 ec f8 8d	e8 97 fd 57	fe d3 01 70	1b 82 a2 59
DEC	768	HEX	300:	ec cb e1 3d	e1 fc c9 1c	11 a0 b2 6c	0b c8 fa 4d
DEC	1008	HEX	3f0:	e7 a7 25 74	f8 78 2a e2	6a ab cf 9e	bc d6 60 65
DEC	1024	HEX	400:	bd f0 32 4e	60 83 dc c6	d3 ce dd 3c	a8 c5 3c 16
DEC	1520	HEX	5f0:	b4 01 10 c4	19 0b 56 22	a9 61 16 b0	01 7e d2 97
DEC	1536	HEX	600:	ff a0 b5 14	64 7e c0 4f	63 06 b8 92	ae 66 11 81
DEC	2032	HEX	7f0:	d0 3d 1b c0	3c d3 3d 70	df f9 fa 5d	71 96 3e bd
DEC	2048	HEX	800:	8a 44 12 64	11 ea a7 8b	d5 1e 8d 87	a8 87 9b f5
DEC	3056	HEX	bf0:	fa be b7 60	28 ad e2 d0	e4 87 22 e4	6c 46 15 a3
DEC	3072	HEX	c00:	c0 5d 88 ab	d5 03 57 f9	35 a6 3c 59	ee 53 76 23
DEC	4080	HEX	ff0:	ff 38 26 5c	16 42 c1 ab	e8 d3 c2 fe	5e 57 2b f8
DEC	4096	HEX	1000:	a3 6a 4c 30	1a e8 ac 13	61 0c cb c1	22 56 ca cc

Key length: 192 bits.

key: 0x0102030405060708090a0b0c0d0e0f101112131415161718

DEC	0	HEX	0:	05	95	e5	7f	e5	f0	bb	3c	70	6e	da	c8	a4	b2	db	11
DEC	16	HEX	10:	df	de	31	34	4a	1a	f7	69	c7	4f	07	0a	ee	9e	23	26
DEC	240	HEX	f0:	b0	6b	9b	1e	19	5d	13	d8	f4	a7	99	5c	45	53	ac	05
DEC	256	HEX	100:	6b	d2	37	8e	c3	41	c9	a4	2f	37	ba	79	f8	8a	32	ff
DEC	496	HEX	1f0:	e7	0b	ce	1d	f7	64	5a	db	5d	2c	41	30	21	5c	35	22
DEC	512	HEX	200:	9a	57	30	c7	fc	b4	c9	af	51	ff	da	89	c7	f1	ad	22
DEC	752	HEX	2f0:	04	85	05	5f	d4	f6	f0	d9	63	ef	5a	b9	a5	47	69	82
DEC	768	HEX	300:	59	1f	c6	6b	cd	a1	0e	45	2b	03	d4	55	1f	6b	62	ac
DEC	1008	HEX	3f0:	27	53	cc	83	98	8a	fa	3e	16	88	a1	d3	b4	2c	9a	02
DEC	1024	HEX	400:	93	61	0d	52	3d	1d	3f	00	62	b3	c2	a3	bb	c7	c7	f0
DEC	1520	HEX	5f0:	96	c2	48	61	0a	ad	ed	fe	af	89	78	c0	3d	e8	20	5a
DEC	1536	HEX	600:	0e	31	7b	3d	1c	73	b9	e9	a4	68	8f	29	6d	13	3a	19
DEC	2032	HEX	7f0:	bd	f0	e6	c3	cc	a5	b5	b9	d5	33	b6	9c	56	ad	a1	20
DEC	2048	HEX	800:	88	a2	18	b6	e2	ec	e1	e6	24	6d	44	c7	59	d1	9b	10
DEC	3056	HEX	bf0:	68	66	39	7e	95	c1	40	53	4f	94	26	34	21	00	6e	40
DEC	3072	HEX	c00:	32	cb	0a	1e	95	42	c6	b3	b8	b3	98	ab	c3	b0	f1	d5
DEC	4080	HEX	ff0:	29	a0	b8	ae	d5	4a	13	23	24	c6	2e	42	3f	54	b4	c8
DEC	4096	HEX	1000:	3c	b0	f3	b5	02	0a	98	b8	2a	f9	fe	15	44	84	a1	68

Key length: 256 bits.

key: 0x0102030405060708090a0b0c0d0e0f101112131415161718191a1b1c1d1e1f20

DEC	0	HEX	0:	ea	a6	bd	25	88	0b	f9	3d	3f	5d	1e	4c	a2	61	1d	91
DEC	16	HEX	10:	cf	a4	5c	9f	7e	71	4b	54	bd	fa	80	02	7c	b1	43	80
DEC	240	HEX	f0:	11	4a	e3	44	de	d7	1b	35	f2	e6	0f	eb	ad	72	7f	d8
DEC	256	HEX	100:	02	e1	e7	05	6b	0f	62	39	00	49	64	22	94	3e	97	b6
DEC	496	HEX	1f0:	91	cb	93	c7	87	96	4e	10	d9	52	7d	99	9c	6f	93	6b
DEC	512	HEX	200:	49	b1	8b	42	f8	e8	36	7c	be	b5	ef	10	4b	a1	c7	cd
DEC	752	HEX	2f0:	87	08	4b	3b	a7	00	ba	de	95	56	10	67	27	45	b3	74
DEC	768	HEX	300:	e7	a7	b9	e9	ec	54	0d	5f	f4	3b	db	12	79	2d	1b	35
DEC	1008	HEX	3f0:	c7	99	b5	96	73	8f	6b	01	8c	76	c7	4b	17	59	bd	90
DEC	1024	HEX	400:	7f	ec	5b	fd	9f	9b	89	ce	65	48	30	90	92	d7	e9	58
DEC	1520	HEX	5f0:	40	f2	50	b2	6d	1f	09	6a	4a	fd	4c	34	0a	58	88	15
DEC	1536	HEX	600:	3e	34	13	5c	79	db	01	02	00	76	76	51	cf	26	30	73
DEC	2032	HEX	7f0:	f6	56	ab	cc	f8	8d	d8	27	02	7b	2c	e9	17	d4	64	ec
DEC	2048	HEX	800:	18	b6	25	03	bf	bc	07	7f	ba	bb	98	f2	0d	98	ab	34
DEC	3056	HEX	bf0:	8a	ed	95	ee	5b	0d	cb	fb	ef	4e	b2	1d	3a	3f	52	f9
DEC	3072	HEX	c00:	62	5a	1a	b0	0e	e3	9a	53	27	34	6b	dd	b0	1a	9c	18
DEC	4080	HEX	ff0:	a1	3a	7c	79	c7	e1	19	b5	ab	02	96	ab	28	c3	00	b9
DEC	4096	HEX	1000:	f3	e4	c0	a2	e0	2d	1d	01	f7	f0	a7	46	18	af	2b	48

Key length: 40 bits.
key: 0x833222772a

DEC	0	HEX	0:	80	ad	97	bd	c9	73	df	8a	2e	87	9e	92	a4	97	ef	da
DEC	16	HEX	10:	20	f0	60	c2	f2	e5	12	65	01	d3	d4	fe	a1	0d	5f	c0
DEC	240	HEX	f0:	fa	a1	48	e9	90	46	18	1f	ec	6b	20	85	f3	b2	0e	d9
DEC	256	HEX	100:	f0	da	f5	ba	b3	d5	96	83	98	57	84	6f	73	fb	fe	5a
DEC	496	HEX	1f0:	1c	7e	2f	c4	63	92	32	fe	29	75	84	b2	96	99	6b	c8
DEC	512	HEX	200:	3d	b9	b2	49	40	6c	c8	ed	ff	ac	55	cc	d3	22	ba	12
DEC	752	HEX	2f0:	e4	f9	f7	e0	06	61	54	bb	d1	25	b7	45	56	9b	c8	97
DEC	768	HEX	300:	75	d5	ef	26	2b	44	c4	1a	9c	f6	3a	e1	45	68	e1	b9
DEC	1008	HEX	3f0:	6d	a4	53	db	f8	1e	82	33	4a	3d	88	66	cb	50	a1	e3
DEC	1024	HEX	400:	78	28	d0	74	11	9c	ab	5c	22	b2	94	d7	a9	bf	a0	bb
DEC	1520	HEX	5f0:	ad	b8	9c	ea	9a	15	fb	e6	17	29	5b	d0	4b	8c	a0	5c
DEC	1536	HEX	600:	62	51	d8	7f	d4	aa	ae	9a	7e	4a	d5	c2	17	d3	f3	00
DEC	2032	HEX	7f0:	e7	11	9b	d6	dd	9b	22	af	e8	f8	95	85	43	28	81	e2
DEC	2048	HEX	800:	78	5b	60	fd	7e	c4	e9	fc	b6	54	5f	35	0d	66	0f	ab
DEC	3056	HEX	bf0:	af	ec	c0	37	fd	b7	b0	83	8e	b3	d7	0b	cd	26	83	82
DEC	3072	HEX	c00:	db	c1	a7	b4	9d	57	35	8c	c9	fa	6d	61	d7	3b	7c	f0
DEC	4080	HEX	ff0:	63	49	d1	26	a3	7a	fc	ba	89	79	4f	98	04	91	4f	dc
DEC	4096	HEX	1000:	bf	42	c3	01	8c	2f	7c	66	bf	de	52	49	75	76	81	15

Key length: 56 bits.
key: 0x1910833222772a

DEC	0	HEX	0:	bc	92	22	db	d3	27	4d	8f	c6	6d	14	cc	bd	a6	69	0b
DEC	16	HEX	10:	7a	e6	27	41	0c	9a	2b	e6	93	df	5b	b7	48	5a	63	e3
DEC	240	HEX	f0:	3f	09	31	aa	03	de	fb	30	0f	06	01	03	82	6f	2a	64
DEC	256	HEX	100:	be	aa	9e	c8	d5	9b	b6	81	29	f3	02	7c	96	36	11	81
DEC	496	HEX	1f0:	74	e0	4d	b4	6d	28	64	8d	7d	ee	8a	00	64	b0	6c	fe
DEC	512	HEX	200:	9b	5e	81	c6	2f	e0	23	c5	5b	e4	2f	87	bb	f9	32	b8
DEC	752	HEX	2f0:	ce	17	8f	c1	82	6e	fe	cb	c1	82	f5	79	99	a4	61	40
DEC	768	HEX	300:	8b	df	55	cd	55	06	1c	06	db	a6	be	11	de	4a	57	8a
DEC	1008	HEX	3f0:	62	6f	5f	4d	ce	65	25	01	f3	08	7d	39	c9	2c	c3	49
DEC	1024	HEX	400:	42	da	ac	6a	8f	9a	b9	a7	fd	13	7c	60	37	82	56	82
DEC	1520	HEX	5f0:	cc	03	fd	b7	91	92	a2	07	31	2f	53	f5	d4	dc	33	d9
DEC	1536	HEX	600:	f7	0f	14	12	2a	1c	98	a3	15	5d	28	b8	a0	a8	a4	1d
DEC	2032	HEX	7f0:	2a	3a	30	7a	b2	70	8a	9c	00	fe	0b	42	f9	c2	d6	a1
DEC	2048	HEX	800:	86	26	17	62	7d	22	61	ea	b0	b1	24	65	97	ca	0a	e9
DEC	3056	HEX	bf0:	55	f8	77	ce	4f	2e	1d	db	bf	8e	13	e2	cd	e0	fd	c8
DEC	3072	HEX	c00:	1b	15	56	cb	93	5f	17	33	37	70	5f	bb	5d	50	1f	c1
DEC	4080	HEX	ff0:	ec	d0	e9	66	02	be	7f	8d	50	92	81	6c	cc	f2	c2	e9
DEC	4096	HEX	1000:	02	78	81	fa	b4	99	3a	1c	26	20	24	a9	4f	ff	3f	61

Key length: 64 bits.

key: 0x641910833222772a

DEC	0	HEX	0:	bb f6 09 de	94 13 17 2d	07 66 0c b6	80 71 69 26
DEC	16	HEX	10:	46 10 1a 6d	ab 43 11 5d	6c 52 2b 4f	e9 36 04 a9
DEC	240	HEX	f0:	cb e1 ff f2	1c 96 f3 ee	f6 1e 8f e0	54 2c bd f0
DEC	256	HEX	100:	34 79 38 bf	fa 40 09 c5	12 cf b4 03	4b 0d d1 a7
DEC	496	HEX	1f0:	78 67 a7 86	d0 0a 71 47	90 4d 76 dd	f1 e5 20 e3
DEC	512	HEX	200:	8d 3e 9e 1c	ae fc cc b3	fb f8 d1 8f	64 12 0b 32
DEC	752	HEX	2f0:	94 23 37 f8	fd 76 f0 fa	e8 c5 2d 79	54 81 06 72
DEC	768	HEX	300:	b8 54 8c 10	f5 16 67 f6	e6 0e 18 2f	a1 9b 30 f7
DEC	1008	HEX	3f0:	02 11 c7 c6	19 0c 9e fd	12 37 c3 4c	8f 2e 06 c4
DEC	1024	HEX	400:	bd a6 4f 65	27 6d 2a ac	b8 f9 02 12	20 3a 80 8e
DEC	1520	HEX	5f0:	bd 38 20 f7	32 ff b5 3e	c1 93 e7 9d	33 e2 7c 73
DEC	1536	HEX	600:	d0 16 86 16	86 19 07 d4	82 e3 6c da	c8 cf 57 49
DEC	2032	HEX	7f0:	97 b0 f0 f2	24 b2 d2 31	71 14 80 8f	b0 3a f7 a0
DEC	2048	HEX	800:	e5 96 16 e4	69 78 79 39	a0 63 ce ea	9a f9 56 d1
DEC	3056	HEX	bf0:	c4 7e 0d c1	66 09 19 c1	11 01 20 8f	9e 69 aa 1f
DEC	3072	HEX	c00:	5a e4 f1 28	96 b8 37 9a	2a ad 89 b5	b5 53 d6 b0
DEC	4080	HEX	ff0:	6b 6b 09 8d	0c 29 3b c2	99 3d 80 bf	05 18 b6 d9
DEC	4096	HEX	1000:	81 70 cc 3c	cd 92 a6 98	62 1b 93 9d	d3 8f e7 b9

Key length: 80 bits.

key: 0x8b37641910833222772a

DEC	0	HEX	0:	ab 65 c2 6e	dd b2 87 60	0d b2 fd a1	0d 1e 60 5c
DEC	16	HEX	10:	bb 75 90 10	c2 96 58 f2	c7 2d 93 a2	d1 6d 29 30
DEC	240	HEX	f0:	b9 01 e8 03	6e d1 c3 83	cd 3c 4c 4d	d0 a6 ab 05
DEC	256	HEX	100:	3d 25 ce 49	22 92 4c 55	f0 64 94 33	53 d7 8a 6c
DEC	496	HEX	1f0:	12 c1 aa 44	bb f8 7e 75	e6 11 f6 9b	2c 38 f4 9b
DEC	512	HEX	200:	28 f2 b3 43	4b 65 c0 98	77 47 00 44	c6 ea 17 0d
DEC	752	HEX	2f0:	bd 9e f8 22	de 52 88 19	61 34 cf 8a	f7 83 93 04
DEC	768	HEX	300:	67 55 9c 23	f0 52 15 84	70 a2 96 f7	25 73 5a 32
DEC	1008	HEX	3f0:	8b ab 26 fb	c2 c1 2b 0f	13 e2 ab 18	5e ab f2 41
DEC	1024	HEX	400:	31 18 5a 6d	69 6f 0c fa	9b 42 80 8b	38 e1 32 a2
DEC	1520	HEX	5f0:	56 4d 3d ae	18 3c 52 34	c8 af 1e 51	06 1c 44 b5
DEC	1536	HEX	600:	3c 07 78 a7	b5 f7 2d 3c	23 a3 13 5c	7d 67 b9 f4
DEC	2032	HEX	7f0:	f3 43 69 89	0f cf 16 fb	51 7d ca ae	44 63 b2 dd
DEC	2048	HEX	800:	02 f3 1c 81	e8 20 07 31	b8 99 b0 28	e7 91 bf a7
DEC	3056	HEX	bf0:	72 da 64 62	83 22 8c 14	30 08 53 70	17 95 61 6f
DEC	3072	HEX	c00:	4e 0a 8c 6f	79 34 a7 88	e2 26 5e 81	d6 d0 c8 f4
DEC	4080	HEX	ff0:	43 8d d5 ea	fe a0 11 1b	6f 36 b4 b9	38 da 2a 68
DEC	4096	HEX	1000:	5f 6b fc 73	81 58 74 d9	71 00 f0 86	97 93 57 d8

Key length: 128 bits.

key: 0xebb46227c6cc8b37641910833222772a

DEC	0	HEX	0:	72	0c	94	b6	3e	df	44	e1	31	d9	50	ca	21	1a	5a	30
DEC	16	HEX	10:	c3	66	fd	ea	cf	9c	a8	04	36	be	7c	35	84	24	d2	0b
DEC	240	HEX	f0:	b3	39	4a	40	aa	bf	75	cb	a4	22	82	ef	25	a0	05	9f
DEC	256	HEX	100:	48	47	d8	1d	a4	94	2d	bc	24	9d	ef	c4	8c	92	2b	9f
DEC	496	HEX	1f0:	08	12	8c	46	9f	27	53	42	ad	da	20	2b	2b	58	da	95
DEC	512	HEX	200:	97	0d	ac	ef	40	ad	98	72	3b	ac	5d	69	55	b8	17	61
DEC	752	HEX	2f0:	3c	b8	99	93	b0	7b	0c	ed	93	de	13	d2	a1	10	13	ac
DEC	768	HEX	300:	ef	2d	67	6f	15	45	c2	c1	3d	c6	80	a0	2f	4a	db	fe
DEC	1008	HEX	3f0:	b6	05	95	51	4f	24	bc	9f	e5	22	a6	ca	d7	39	36	44
DEC	1024	HEX	400:	b5	15	a8	c5	01	17	54	f5	90	03	05	8b	db	81	51	4e
DEC	1520	HEX	5f0:	3c	70	04	7e	8c	bc	03	8e	3b	98	20	db	60	1d	a4	95
DEC	1536	HEX	600:	11	75	da	6e	e7	56	de	46	a5	3e	2b	07	56	60	b7	70
DEC	2032	HEX	7f0:	00	a5	42	bb	a0	21	11	cc	2c	65	b3	8e	bd	ba	58	7e
DEC	2048	HEX	800:	58	65	fd	bb	5b	48	06	41	04	e8	30	b3	80	f2	ae	de
DEC	3056	HEX	bf0:	34	b2	1a	d2	ad	44	e9	99	db	2d	7f	08	63	f0	d9	b6
DEC	3072	HEX	c00:	84	a9	21	8f	c3	6e	8a	5f	2c	cf	be	ae	53	a2	7d	25
DEC	4080	HEX	ff0:	a2	22	1a	11	b8	33	cc	b4	98	a5	95	40	f0	54	5f	4a
DEC	4096	HEX	1000:	5b	be	b4	78	7d	59	e5	37	3f	db	ea	6c	6f	75	c2	9b

Key length: 192 bits.

key: 0xc109163908ebe51debb46227c6cc8b37641910833222772a

DEC	0	HEX	0:	54	b6	4e	6b	5a	20	b5	e2	ec	84	59	3d	c7	98	9d	a7
DEC	16	HEX	10:	c1	35	ee	e2	37	a8	54	65	ff	97	dc	03	92	4f	45	ce
DEC	240	HEX	f0:	cf	cc	92	2f	b4	a1	4a	b4	5d	61	75	aa	bb	f2	d2	01
DEC	256	HEX	100:	83	7b	87	e2	a4	46	ad	0e	f7	98	ac	d0	2b	94	12	4f
DEC	496	HEX	1f0:	17	a6	db	d6	64	92	6a	06	36	b3	f4	c3	7a	4f	46	94
DEC	512	HEX	200:	4a	5f	9f	26	ae	ee	d4	d4	a2	5f	63	2d	30	52	33	d9
DEC	752	HEX	2f0:	80	a3	d0	1e	f0	0c	8e	9a	42	09	c1	7f	4e	eb	35	8c
DEC	768	HEX	300:	d1	5e	7d	5f	fa	aa	bc	02	07	bf	20	0a	11	77	93	a2
DEC	1008	HEX	3f0:	34	96	82	bf	58	8e	aa	52	d0	aa	15	60	34	6a	ea	fa
DEC	1024	HEX	400:	f5	85	4c	db	76	c8	89	e3	ad	63	35	4e	5f	72	75	e3
DEC	1520	HEX	5f0:	53	2c	7c	ec	cb	39	df	32	36	31	84	05	a4	b1	27	9c
DEC	1536	HEX	600:	ba	ef	e6	d9	ce	b6	51	84	22	60	e0	d1	e0	5e	3b	90
DEC	2032	HEX	7f0:	e8	2d	8c	6d	b5	4e	3c	63	3f	58	1c	95	2b	a0	42	07
DEC	2048	HEX	800:	4b	16	e5	0a	bd	38	1b	d7	09	00	a9	cd	9a	62	cb	23
DEC	3056	HEX	bf0:	36	82	ee	33	bd	14	8b	d9	f5	86	56	cd	8f	30	d9	fb
DEC	3072	HEX	c00:	1e	5a	0b	84	75	04	5d	9b	20	b2	62	86	24	ed	fd	9e
DEC	4080	HEX	ff0:	63	ed	d6	84	fb	82	62	82	fe	52	8f	9c	0e	92	37	bc
DEC	4096	HEX	1000:	e4	dd	2e	98	d6	96	0f	ae	0b	43	54	54	56	74	33	91

Key length: 256 bits.

key: 0xlada31d5cf688221c109163908ebe51debb46227c6cc8b37641910833222772a

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DEC    0 HEX    0: dd 5b cb 00 18 e9 22 d4 94 75 9d 7c 39 5d 02 d3
DEC   16 HEX   10: c8 44 6f 8f 77 ab f7 37 68 53 53 eb 89 a1 c9 eb
DEC  240 HEX  f0: af 3e 30 f9 c0 95 04 59 38 15 15 75 c3 fb 90 98
DEC  256 HEX 100: f8 cb 62 74 db 99 b8 0b 1d 20 12 a9 8e d4 8f 0e
DEC  496 HEX 1f0: 25 c3 00 5a 1c b8 5d e0 76 25 98 39 ab 71 98 ab
DEC  512 HEX 200: 9d cb c1 83 e8 cb 99 4b 72 7b 75 be 31 80 76 9c
DEC  752 HEX 2f0: a1 d3 07 8d fa 91 69 50 3e d9 d4 49 1d ee 4e b2
DEC  768 HEX 300: 85 14 a5 49 58 58 09 6f 59 6e 4b cd 66 b1 06 65
DEC 1008 HEX 3f0: 5f 40 d5 9e c1 b0 3b 33 73 8e fa 60 b2 25 5d 31
DEC 1024 HEX 400: 34 77 c7 f7 64 a4 1b ac ef f9 0b f1 4f 92 b7 cc
DEC 1520 HEX 5f0: ac 4e 95 36 8d 99 b9 eb 78 b8 da 8f 81 ff a7 95
DEC 1536 HEX 600: 8c 3c 13 f8 c2 38 8b b7 3f 38 57 6e 65 b7 c4 46
DEC 2032 HEX 7f0: 13 c4 b9 c1 df b6 65 79 ed dd 8a 28 0b 9f 73 16
DEC 2048 HEX 800: dd d2 78 20 55 01 26 69 8e fa ad c6 4b 64 f6 6e
DEC 3056 HEX bf0: f0 8f 2e 66 d2 8e d1 43 f3 a2 37 cf 9d e7 35 59
DEC 3072 HEX c00: 9e a3 6c 52 55 31 b8 80 ba 12 43 34 f5 7b 0b 70
DEC 4080 HEX ff0: d5 a3 9e 3d fc c5 02 80 ba c4 a6 b5 aa 0d ca 7d
DEC 4096 HEX 1000: 37 0b 1c 1f e6 55 91 6d 97 fd 0d 47 ca 1d 72 b8

```

3. Security Considerations

The RC4 algorithm does not meet the basic criteria required for an encryption algorithm, as its output is distinguishable from random. The use of RC4 continues to be recommended against; in particular, its use in new specifications is discouraged. This note is intended only to aid the interoperability of existing specifications that make use of RC4.

4. Copying Conditions

This document is intended to be considered a Code Component, and is thus effectively available under the Simplified BSD License.

5. References

5.1. Normative References

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