MAIN PART

Introduction

The following is an investigation of two world record runs set by TsukishimaHato. The first is a 16:20, set on EMU on June 29, 2010. The second is a 16:11, set on N64 on April 10, 2011.

It was discovered in October 2023 that his 16:20 has undeniable splices which are evident through mismatches of coin scores. In the same month, his 16:11 has been analyzed using a method of splice detection that was discovered in July 2023. With that method, it was possible to also find several splices in his 16:11.

Proving that he is a cheater does not need any great efforts, as anyone who opens the video of the 16:20 will easily spot the mismatching coin scores. Since the video wasn't available online between 2010 and 2023, it seems like nobody had ever become aware of them, but the run is very evidently cheated. I want to also prove that he spliced his 16:11 on N64 and thereby show that TsukishimaHato's entire career is fraudulent.

As far as the methodology that I apply on the 16:11 is concerned, Mario's blinking follows a set animation timer. This means that he will blink every 64 frames excluding idle frames. This is very inconsistent in both runs, which proves that they are spliced.

Original 16:11 video: https://www.youtube.com/watch?v=nR86rtfJ_bc

Original 16:20 video: https://www.youtube.com/watch?v=111_7hLNeDA

Extra on the 16:11:
YouTube upload of the comparison: https://www.youtube.com/watch?v=3iEjc4Da5jI
(The run is on the right side of the video.)

Original link to the comparison: http://www.nicovideo.jp/watch/1302952687

I. Background on TsukishimaHato

TsukishimaHato has done his first ever run of SM64 on April 4, 2010 with a 39:38 in 16 Star. He held the world record with a time of 16:20 on June 29, 2010 and, by that, beat second place by 18 seconds. This was all done on Emulator, and he probably would have had the fastest improvement rate of anyone who had ever run the game

had this been true. He would have taken the world record in less than 100 days of playing the game.

We know that SilentSlayers was casting doubt on whether his 16:20 was legitimate back in 2010. He noted that Tsukishima's gameplay was quite bad but he had a perfect consistency on hard strats, and that several people he talked to agreed that the run looked like a TAS, but Tsukishima denied it. We also know that Tsukishima's time was removed from the Japanese leaderboards in August 2010, even before the times of other notable cheaters were removed later that year. When he set a 16:11 on N64 in April 2011, which was another world record, hardly anyone ever doubted him again. But this was the only footage of him playing on N64, and the sound quality of the run didn't allow for splice checks with old methods.

II. 16:20 Analysis

These are the coin scores throughout Whomp's Fortress. The star select after collecting Shoot into the Wild Blue (third star) shows a high score of 12 coins, which he **did not** actually get, and the score displayed on level exit after Fall onto the Caged Island only goes up to 2 coins but he had 3 when collecting the star. These two mismatches prove, beyond a doubt, that Tsukishima's 16:20 is a spliced run.

III. Blink Method for Splice Detection

Since Tsukishima's 16:11 does not have strikingly obvious splices, a more sophisticated method needs to be applied here, which will now be explained in sufficient detail before using it.

Mario's blinking is on an animation timer. This means that he blinks on a cycle of 64 frames, which, as far as we know, remains fully consistent as the game is being played and won't be brought off-sync by anything. The timer is interrupted by loading and idle frames. This includes the save game menu after high score calculations, star select, and certain textboxes such as the one when first entering LLL.

Mario's eyes will be clearly visible, for the most part, on star grabs and their subsequent level exits. These are the most desirable spots to check the state of the blinking animation, and they occur frequently enough to cover almost all spots that could be used for splicing in any given run.

In the following investigation, I note down the timestamps on which blinking visibly occurs in Tsukishima's 16:11 between WF and HMC, because this part of the run contains the most transitions. I record the time delta between these instances and subtract all idle frames on which the blinking animation timer is paused and check if the amount of frames between the two blinking instances is roughly 64 or a multiple of it. If there is a notable discrepancy, we may assume that a splice is likely because it is unclear how else the discrepancy can be explained.

I present an additional analysis of Shigeru's 16:05 at the end which shows that the blinking cycle remains intact through all transitions in his run. This should guarantee that the method works (and that I applied it correctly), and that any discrepancies in Tsukishima's runs are practically inexcusable.

For more detailed information on how to analyze runs with this method, refer to this video: https://www.youtube.com/watch?v=sVS5lqykvA4

Note that in the above explanation video, one frame too many of painting entry is excluded, whereas one frame too few of stage entry (after the stars on star select stop rotating) is excluded.

The following video further demonstrates how the blinking works. The number on the top left is the area update counter and the video on the right removes the screen transitions: https://www.youtube.com/watch?v=7r3KJHVOBws

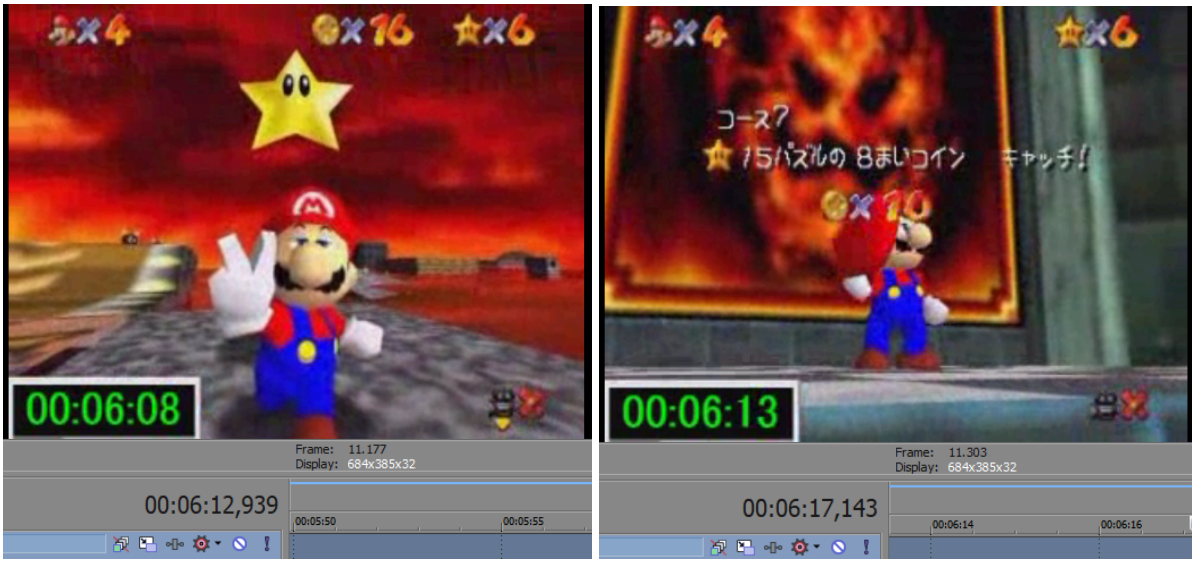
It is important to be aware that lag frames can cause perceived discrepancies in the blinking cycle. It is generally not a big problem because there is little lag on most short stars, but it can explain some issues we may spot. As we see with Shigeru's 16:05, there is one instance in this sample - but only one - where lag seems to be a bigger factor.

IV. 16:20 Analysis (via Blink Checks)

Knowing that the 16:20 is spliced, we can first apply the blink method here with great success. The run has two instances of splicing which are particularly notable. The first can be seen by contrasting the two blinking cycles starting at 4:44.63 and 4:50.30 (timestamps according to the video itself, not the timer in the video). This is a difference of 5.66 seconds, or 170 frames. We can also see that there are circa 21

frames of loading inbetween. If we subtract them, we find that the blinking appears in an interval of 149 frames. This is 21 frames away from the expected value of 128. While subtle by comparison, it perfectly confirms the obvious coin count mismatch that we see.

The second notable splicing instance can be found on the blinks at 6:12.93 and 6:17.13. Here, they are 4.20 seconds apart, or 126 frames, and loading makes up 17 of these frames, so there are actually 109 non-idle frames between these two blinking instances. This means that, this time, they are 19 frames below the expected value of 128. This alone would prove, without ambiguity, that the run is not legitimate.



Looking at the 16:20 in-depth, we see that the run has many instances of 64 and 128 frames between blinking on star grabs and their following level entries, which

establishes that these two discrepancies stand out as unusual, and that the method itself is not flawed or misapplied.

V. 16:11 Analysis

The black timestamps in the analysis below are frames on which Mario starts to blink. The number in brackets is a conversion of the timestamp into the total frame count. All blinking timestamps ought to be perfectly aligned with the comparison video linked at the start of this document (this was the only video available to me when I started the investigation).

The green/red brackets show frames that have passed since the last blinking instance. The idle frame periods, all of which were measured manually, are subtracted from these respective time deltas and allow us to get the number of non-idle frames that have passed since the last timespan, and whether it is close to the multiple of 64 that it usually has to be aligned with.

Disclaimer: The lengths of idle frame periods might be off by up to 1-2 frames on certain instances due to misidentifying the start/end points of those idle frame periods. This is insignificant in respect to the discrepancies because they are much larger than that. Some of that is down to human error, but 100% accuracy is also impossible because of potential lag frames and because the video of the run has a rate of 14.985 FPS (half of 29.97), which means that exactly every second frame of gameplay is omitted in the recording. Since we deal with fading transitions, it is naturally very difficult to perfectly identify the exact start and end frames.

Disclaimer 2: This analysis is based off of a download of the Niconico upload of the comparison video. The in-game timer in that video served as a direct reference for when each second starts/ends.

3:37.43 (6523) Star Grab #2

3:42.23 (6667) Level Exit #2 **(144 - 16 = 128 frames) target 128**

4:05.30 (7359) Star Grab #3 **(692 - 67 = 625 frames), target 640**

4:10.06 (7502) Level Exit #3 **(143 - 16 = 127 frames), target 128**

4:35.00 (8250) Star Grab #4 **(748 - 69 = 679 frames), target 704**

4:39.80 (8394) Level Exit #4 **(144 - 16 = 128 frames), target 128**

(WF -> LLL)

5:31.86 (9956) Star Grab #5 **(1562 - 92 = 1470 frames), target 1472**

5:34.36 (10031) Level Exit #5 **(75 - 14 = 61 frames), target 64**

6:05.33 (10960) Star Grab #6 **(929 - 82 = 847 frames), target 832**

6:09.96 (11099) Level Exit #6 **(139 - 14 = 125 frames), target 128**

6:40.93 (12028) Star Grab #7 **(929 - 79 = 850 frames), target 832**

6:45.66 (12170) Level Exit #7 **(142 - 14 = 128 frames), target 128**

7:16.53 (13096) Star Grab #8 **(926 - 67 = 859 frames), target 832**

7:21.23 (13237) Level Exit #8 **(141 - 14 = 127 frames), target 128**

7:49.26 (14078) Star Grab #9 **(841 - 71 = 770 frames), target 768**

7:51.80 (14154) Level Exit #9 **(76 - 13 = 63 frames), target 64**

(LLL -> SSL)

8:24.36 (15131) Star Grab #10 **(977 - 72 = 905 frames), target 896**

8:26.93 (15208) Level Exit #10 **(77 - 13 = 64 frames), target 64**

8:44.46 (15734) Star Grab #11 **(516 - 69 = 457 frames), target 448**

8:49.20 (15876) Level Exit #11 **(142 - 14 = 128 frames), target 128**

(SSL -> HMC)

9:25.23 (16957) Star Grab #12 **(1081 - 74 = 1007 frames), target 1024**

9:27.86 (17036) Level Exit #12 **(79 - 14 = 65 frames) target 64**

9:53.80 (17814) Star Grab #13 **(778 - 76 = 702 frames), target 704**

9:56.40 (17892) Level Exit #13 **(78 - 14 = 64 frames), target 64**

10:40.63 (19219) Star Grab #15 **(1327 - 73 = 1254 frames), target 1280**

10:45.43 (19363) Level Exit #15 **(144 - 13 = 131 frames), target 128**

VI. Conclusion

Splices in the 16:20 undeniably prove that TsukishimaHato is a cheater. The application of the blink check on the 16:11, his N64 world record, has yielded nine instances of likely splices, and proves that he never changed and had not become legitimate in the nine months that had gone by since his previous world record. The discrepancies in blinking are up to 27 frames off of what the animation timer dictates (32 frames is the maximum possible deviation from a 64 frame cycle). Additionally,

the inconsistencies arbitrarily appear in either direction. Sometimes they overcut the expected value, and sometimes they undercut it, which in itself shouldn't happen if there is a sensible explanation as to why the blinking cycle isn't aligned, or if the method was misapplied.

Especially the instances that undercut the expected values by more than ten frames are practically indefensible. If we assume that we missed certain idle frames, such as lag frames, this would only ever mean that the expected value will then be undercut by an even greater margin once we factored them in. Furthermore, every single transition from a star grab to its level exit is as it should be in the video. Otherwise, we still ought to find that the real values mismatch the expected values according to a pattern, but in reality the mismatches are themselves inconsistent.

The comparison with Shigeru, which is presented among the extra material, should alleviate most doubts that could be had in any case. All but one transition in Shigeru's run were within four frames of the expected values, even on those instances where the compared timestamps were hundreds of frames apart. And even the one odd transition could be explained with lag frames that become apparent in the video itself.

EXTRA MATERIAL: IN-DEPTH ANALYSES

About the Extra Material

There are three runs of which I splice checked all blinking instances between WF and HMC, those are both of Tsukishima's runs, and Shigeru's 16:05 which is found in a comparison video alongside the 16:11. Since the 16:20 was proven as spliced through other means, and since the 16:05 is legitimate, the checks of those runs are not particularly important for this investigation.

What they show, regardless, is that splices seem to appear frequently in both of Tsukishima's runs. By comparison, the analysis of Shigeru's run illustrates what a legitimate run looks like. The analysis of Shigeru's run serves to show that the method was applied correctly, and that it is reliable, even on long intervals. It is also evident that there are plenty of instances in both of Tsukishima's runs where the blinking matches up, which leaves no room for any excuses on why it doesn't match up for the entire duration of these runs.

Full Blink Check of the 16:20

(Idle frame periods are based on estimates. They were not manually measured.)

Note that these timestamps follow the video itself and not the timer on display. As such, the timestamps were essentially gathered from Sony Vegas. The video of the run has 15 FPS, which is important to be aware of. If you were to look at it with YouTube's frame advance function, it would always advance two frames at once. Because of the framerate, and because the run itself evidently uses counter-factor 2, some measurements could be less precise than usual, which is also why I don't attribute much importance to this particular check. The two important splices that are indicated with exclamation marks are perfectly precise, however.

3:44.80 Star #2

3:49.70 Exit #2 **(147 - 20 = 127 frames), target 128**

4:13.03 Star #3 **(700 - 68 = 632 frames), target 640**

4:18.30 Exit #3 **(158 - 30 = 128 frames), target 128**

4:44.63 Star #4 **(790 - 68 = 722 frames), target 704**

4:50.30 Exit #4 **(170 - 21 = 149 frames), target 128** **!!!**

(WF -> LLL)

5:41.93 Star #5 **(1549 - 88 = 1461 frames), target 1472**

5:47.10 Exit #5 **(155 - 25 = 130 frames), target 128**

6:12.93 Star #6 **(775 - 68 = 707 frames), target 704**

6:17.13 Exit #6 **(126 - 17 = 109 frames), target 128** **!!!**

6:52.06 Star #7 **(1048 - 80 = 968 frames), target 960**

6:57.16 Exit #7 **(153 - 25 = 128 frames), target 128**

7:29.50 Star #8 **(964 - 68 = 896 frames), target 896**

7:32.50 Exit #8 **(150 - 25 = 125 frames), target 128**

8:07.16 Star #9 **(1040 - 80 = 960 frames), target 960**

8:12.03 Exit #9 **(146 - 18 = 128 frames), target 128**

(LLL -> SSL)

8:44.23 Star #10 **(966 - 68 = 898 frames), target 896**

8:46.96 Exit #10 **(82 - 18 = 64 frames), target 64**

9:04.20 Star #11 **(517 - 68 = 449 frames), target 448**

9:09.00 Exit #11 **(144 - 18 = 126 frames), target 128**

(SSL -> HMC)

9:41.30 Star #12 **(969 - 72 = 897 frames), target 896**

9:44.00 Exit #12 **(90 - 25 = 65 frames), target 64**

10:14.50 Star #14 **(915 - 72 = 843 frames), target 832**

10:17.50 Exit #14 **(90 - 25 = 65 frames), target 64**

11:03.16 Star #15 **(1370 - 72 = 1298 frames), target 1280**

11:07.93 Exit #15 **(143 - 18 = 125 frames), target 128**

Full Blink Check of Shigeru's 16:05

(Idle frame periods are based on estimates. They were not manually measured.)

This analysis serves as a reference of what it looks like to splice check an undoubtedly legitimate run, even when relying only on estimates for idle frames.

3:36.13 Star #2

3:40.93 Exit #2 **(144 - 16 = 128 frames), target 128**

4:06.76 Star #3 **(775 - 70 = 705 frames), target 704**

4:09.43 Exit #3 **(80 - 16 = 64 frames), target 64**

4:33.20 Star #4 **(713 - 70 = 643 frames), target 640**

4:37.96 Exit #4 **(143 - 16 = 127 frames), target 128**

(WF -> LLL)

5:30.16 Star #5 **(1566 - 92 = 1474 frames), target 1472**

5:34.86 Exit #5 **(141 - 14 = 127 frames), target 128**

6:07.10 Star #6 **(967 - 70 = 897 frames), target 896**

6:09.66 Exit #6 **(77 - 14 = 63 frames), target 64**

6:46.50 Star #7 **(1105 - 82 = 1023 frames), target 1024**

6:49.10 Exit #7 **(78 - 14 = 64 frames), target 64**

7:21.56 Star #8 **(974 - 82 = 892 frames), target 896**

7:26.30 Exit #8 **(143 - 14 = 129 frames), target 128**

7:54.30 Star #9 **(840 - 70 = 770 frames), target 768**

7:59.00 Exit #9 **(141 - 14 = 127 frames), target 128**

(LLL -> SSL)

8:29.16 Star #10 **(905 - 70 = 835 frames), target 832**

8:34.06 Exit #10 **(147 - 16 = 131 frames), target 128**

8:51.46 Star #11 **(522 - 70 = 452 frames), target 448**

8:56.30 Exit #11 **(145 - 16 = 129 frames), target 128**

(SSL -> HMC)

9:31.10 Star #12 **(1044 - 74 - 7 = 963 frames), target 960***

9:33.66 Exit #12 **(77 - 14 = 63 frames), target 64**

10:12.43 Star #14 **(1163 - 74 = 1089 frames), target 1088**

10:15.00 Exit #14 **(77 - 14 = 63 frames), target 64**

10:43.13 Star #15 **(844 - 74 = 770 frames), target 768**

10:47.76 Exit #15 **(139 - 14 = 125 frames), target 128**

* There seem to be 7 lag/freeze frames on the way down to the star.