

Exhibit A.3

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UNITED STATES DISTRICT COURT
EASTERN DISTRICT OF TEXAS
TYLER DIVISION

Case No.
6:09-cv-00269-LED -JDL

Bedrock Computer Technologies, LLC .)
)
vs.)
Plaintiff,)
)
)
Softlayer Technologies, Inc. et al)
)
Defendants.)
)

The video and oral deposition of MARK T. JONES, PH.D.,
taken on Wednesday, February 9, 2011, commencing at 8:00
a.m., held at the Inn of Virginia Tech, 901 Prices Fork
Road, the Smithfield Room, Blacksburg, VA, before T. S.
Hubbard, Jr., Court Reporter and Notary Public for the
Commonwealth of Virginia.

C O N F I D E N T I A L T R A N S C R I P T
F O R A T T O R N E Y S E Y E S O N L Y

Job No. CS312510

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114	<p>1 Q For the two conditions that you</p> <p>2 have in Columns D and E, one is the 120</p> <p>3 enabled and the other is the cache enabled,</p> <p>4 right?</p> <p>5 A Yes.</p> <p>6 Q For Column D with the cache enabled</p> <p>7 what modification did you make that is</p> <p>8 represented in Column D?</p> <p>9 A To turn the variable, which off the</p> <p>10 top of my head, is rebuilt count, I don't</p> <p>11 recall the exact name of the variable, but</p> <p>12 there is a variable that can be set to</p> <p>13 disable counting in version 2.6.31 of Linux</p> <p>14 and that is what I did.</p> <p>15 Q Did you do anything else to enable</p> <p>16 the cache?</p> <p>17 A No.</p> <p>18 Q When you turned off the variable</p> <p>19 which you believe is the rebuilt count?</p> <p>20 A Something like that, yes.</p> <p>21 Q You modified, you changed the way</p> <p>22 the kernel operated, is that right?</p> <p>23 A I didn't make any modifications to</p> <p>24 the code. Did it change the way it operated,</p> <p>25 yes.</p>	116	<p>1 Appendix H to your report. I believe we were</p> <p>2 talking about Column E in the modification to</p> <p>3 the 2.6.31 version of Linux.</p> <p>4 What modification did you make to</p> <p>5 the code for Column E?</p> <p>6 A For the case where the 120 is, what</p> <p>7 I termed not enabled I disabled the</p> <p>8 commenting out the candidate deletion. I</p> <p>9 would have to go back and look at that code</p> <p>10 to see exactly what that modification was,</p> <p>11 but effectively disabled that.</p> <p>12 I did not have the GenID deletion</p> <p>13 due to the timer expiring was not occurring</p> <p>14 during that condition.</p> <p>15 I left part of the GenID deletion in</p> <p>16 place which would occur when that particular</p> <p>17 version of Linux determines that there are too</p> <p>18 many entries in a chain, and so that would be</p> <p>19 invoked when the system determines that the</p> <p>20 cache is to be invalidated.</p> <p>21 Q Did you produce that modification</p> <p>22 that you made?</p> <p>23 A For that column, yes, I did.</p> <p>24 Q Do you recall which appendix? Was</p> <p>25 it an appendix report or was it in the</p>
115	<p>1 Q In Column E you have 120 enabled,</p> <p>2 and what condition did you create or</p> <p>3 condition is reflected in Column E?</p> <p>4 A If it's a "1" it is the unmodified</p> <p>5 2.6.31 kernel. If it's a zero, it reflects a</p> <p>6 modified version of that.</p> <p>7 Q What is the modification?</p> <p>8 A That is the code I gave in one of</p> <p>9 the appendices.</p> <p>10 MS. WILLIAMS: I think we need to</p> <p>11 change tapes.</p> <p>12 THE VIDEOGRAPHER: This marks the</p> <p>13 end of videotape number 2 in the deposition</p> <p>14 of Mark Jones. Going off the record. The</p> <p>15 time is 12:14.</p> <p>16 (Whereupon, a break in the</p> <p>17 proceedings with everyone</p> <p>18 agreeing to take the luncheon</p> <p>19 recess, and on resuming.)</p> <p>20 THE VIDEOGRAPHER: This marks the</p> <p>21 beginning of videotape number 3 in the</p> <p>22 deposition of Mark Jones. The time is 12:59.</p> <p>23 Please continue.</p> <p>24 BY MS. WILLIAMS:</p> <p>25 Q Dr. Jones, we were looking at</p>	117	<p>1 supplemental production?</p> <p>2 A My recollection is that it would</p> <p>3 have been an appendix, but I am not certain.</p> <p>4 THE REPORTER: Presenting Exhibit 6</p> <p>5 to the witness.</p> <p>6 (Whereupon, Defendants Jones</p> <p>7 Exhibit Number 6 is marked for</p> <p>8 Identification.)</p> <p>9 BY MS. WILLIAMS:</p> <p>10 Q Dr. Jones, I am handing you, or you</p> <p>11 have been handed Exhibit 6. It does not have</p> <p>12 Bates numbers on it.</p> <p>13 As I understand it, this is part of</p> <p>14 your report that was delivered to us by</p> <p>15 counsel for Bedrock. I don't believe it was</p> <p>16 necessarily an appendix to your report or</p> <p>17 just part of the supplemental documentation.</p> <p>18 Can you tell me what Exhibit 6 is?</p> <p>19 A Sure. This is the modified version</p> <p>20 of route.c in the appendix that we were just</p> <p>21 looking at. It reflects the case where 120</p> <p>22 enabled is zero in that column.</p> <p>23 Q So when there is a zero in Column E</p> <p>24 in Appendix H that means that it is the</p> <p>25 modified version of 2.6.31?</p>

118	<p>1 A Yes, this modified version.</p> <p>2 Q The modified version of 2.6.31, or</p> <p>3 excuse me, the modifications that you made to</p> <p>4 2.6.31 are reflected in Exhibit 6?</p> <p>5 A Yes.</p> <p>6 Q Can you point us to where the</p> <p>7 modification is?</p> <p>8 A At Line 1126 and again Lines 1156</p> <p>9 to 1164.</p> <p>10 Q This is on page 18 of Exhibit 6?</p> <p>11 A Yes.</p> <p>12 Q Describe for us again what</p> <p>13 modifications you made to the code referring</p> <p>14 to the code lines with the document that you</p> <p>15 have in front of you?</p> <p>16 A At Line 1126, I am removing the</p> <p>17 call to rt_free and at Lines 1156 to 1164, I</p> <p>18 am removing the checking associated with</p> <p>19 identifying a candidate record.</p> <p>20 Q Why did you remove rt_free in Line</p> <p>21 1126?</p> <p>22 A I did not want to have the code pay</p> <p>23 the cost of freeing that record. In the case</p> <p>24 where during the testing if the code were to</p> <p>25 identify a chain length that is too long and</p>	120	<p>1 A The other alternatives that I</p> <p>2 explored, one would be simply to comment out</p> <p>3 the removal in Line 1125 of a record from the</p> <p>4 linked list.</p> <p>5 If you do that there is essentially</p> <p>6 no reasonable way out of this routine. Since</p> <p>7 you are not removing anything from the chain,</p> <p>8 it will keep seeing the chain length as too</p> <p>9 long going back to the invalidated cache</p> <p>10 again. It will go back up to the top and</p> <p>11 restart things until it decides to turn the</p> <p>12 cache off completely.</p> <p>13 Another alternative that I explored</p> <p>14 was to simply remove both of those to do the</p> <p>15 same removal, but also to disable disability,</p> <p>16 to rebuild the hash table or that call to do</p> <p>17 it, that performs worse than what I did as</p> <p>18 well.</p> <p>19 So what I did which I thought would</p> <p>20 be the best approximation, a sort of best case</p> <p>21 scenario for invalidating that cache, yet</p> <p>22 still going on with the operation to put this</p> <p>23 entry in the cache as well as continuing the</p> <p>24 operation of the system.</p> <p>25 Q Where in the while loop does this</p>
119	<p>1 invalidates the cache, I didn't want it to</p> <p>2 pay the price of that freeing that occurs</p> <p>3 there.</p> <p>4 Q What do you mean "pay the cost or</p> <p>5 pay the price of freeing that record"?</p> <p>6 A There is computation time</p> <p>7 associated with calling that routine and I</p> <p>8 did not want to have that reflected in the</p> <p>9 test results.</p> <p>10 Q Why not?</p> <p>11 A What I was trying to come up with</p> <p>12 was something that I thought would be a best</p> <p>13 case performance scenario if I were to come</p> <p>14 up with a version that would remove the</p> <p>15 on-the-fly deletion.</p> <p>16 In combination with this mechanism</p> <p>17 in rt_intern_hash in this version, that when</p> <p>18 the chain length is too long the Linux decides</p> <p>19 to go ahead and rebuild the cache, that</p> <p>20 something has gone wrong and I wanted to come</p> <p>21 up with a way that I thought would be a</p> <p>22 reasonable approximation of sort of the best</p> <p>23 case scenario for doing that.</p> <p>24 Q Why was the commenting out of 1126</p> <p>25 the best way to do that?</p>	121	<p>1 code check the chain length?</p> <p>2 A It is not in the while loop in</p> <p>3 terms of talking of checking the chain length</p> <p>4 that I am talking about.</p> <p>5 Q Where is it?</p> <p>6 A Starting at 1183.</p> <p>7 Q That is outside the while loop?</p> <p>8 A Yes.</p> <p>9 Q If I understand you correctly, for</p> <p>10 Line 1126 that deletes a record from memory?</p> <p>11 A It makes a call that will start</p> <p>12 that process, will start that process, yes.</p> <p>13 Q So you commented Line 1126 out?</p> <p>14 A Yes.</p> <p>15 Q You talked about a couple of</p> <p>16 alternatives to try and create this best case</p> <p>17 scenario that you described, that you didn't</p> <p>18 consider to be helpful in what you were</p> <p>19 trying to ascertain?</p> <p>20 A They both, when I tested them,</p> <p>21 performed worse than what I did here.</p> <p>22 Q What do you mean worse?</p> <p>23 A Their performance rate got much</p> <p>24 worse than the performance rate that this</p> <p>25 modified version achieved.</p>

122	<p>1 Q Did you consider commenting out</p> <p>2 Line 1183?</p> <p>3 A I did a version that did exactly</p> <p>4 that, yes.</p> <p>5 Q That also commented out 1126?</p> <p>6 A Yes, I would have done more than</p> <p>7 1126, and in that case, I would have removed</p> <p>8 1125, and disabled the check in 1183, I would</p> <p>9 do that just by not incrementing the chain</p> <p>10 length.</p> <p>11 Q For that test where are those</p> <p>12 results reflected?</p> <p>13 A I didn't report those results.</p> <p>14 Q Do you still have the results from</p> <p>15 that exercise?</p> <p>16 A I should have a subset of those at</p> <p>17 least.</p> <p>18 Q While we are talking about test</p> <p>19 results that are not reflected in your report</p> <p>20 you mentioned earlier that you tested other</p> <p>21 Linux versions other than the 2.6.31, right?</p> <p>22 A Yes.</p> <p>23 Q Those versions were 2.6.26?</p> <p>24 A I think it was 2.6 -- Well, by</p> <p>25 tested you mean not modified?</p>	124	<p>1 for modifications to 2.6.31?</p> <p>2 A That is correct.</p> <p>3 Q Where are the test results for the</p> <p>4 modified versions of 2.6.26 or 2.6.28?</p> <p>5 A I doubt I have them. I can check</p> <p>6 and see if I do, but I doubt I do.</p> <p>7 Q Why do you doubt you have them?</p> <p>8 A When I was doing like sort of what</p> <p>9 I would call the expiration of these test</p> <p>10 results, I would do these runs manually, and</p> <p>11 by that I mean essentially run something and</p> <p>12 reserve the results, change something on</p> <p>13 something, I observed the results and so I</p> <p>14 was not collecting.</p> <p>15 It would be something like to look</p> <p>16 at the numbers on the screen kind of testing</p> <p>17 instead of eventually running a script that</p> <p>18 collected everything I wanted.</p> <p>19 Q Why did you do that?</p> <p>20 A Why did I do it? Why did I follow</p> <p>21 that procedure?</p> <p>22 Q Yes?</p> <p>23 A In terms of running the results and</p> <p>24 inspecting the results, it was making sure I</p> <p>25 am testing what I think I am testing, to look</p>
123	<p>1 Q Yes.</p> <p>2 A 2.6.26, 2.6.28, I believe, 2.6.31</p> <p>3 and 2.6.34.</p> <p>4 Q Where are the test results for</p> <p>5 those versions of Linux?</p> <p>6 A 2.6.31 is in the report. The other</p> <p>7 results, I don't have in the report.</p> <p>8 Q Where are they?</p> <p>9 A I don't know that I kept any of</p> <p>10 those. I can look and see if I did.</p> <p>11 Q Then you mentioned that you made</p> <p>12 modifications to 2.2.31, 2.6.26, or 2.6.28,</p> <p>13 is that right?</p> <p>14 A Yes.</p> <p>15 Q Did you modify any other versions?</p> <p>16 Excuse me. Did you test any other modified</p> <p>17 versions of Linux?</p> <p>18 A No.</p> <p>19 Q The only test results for modified</p> <p>20 versions of Linux were the two modification</p> <p>21 for 2.6.31?</p> <p>22 A Sorry, could you do that one again,</p> <p>23 please?</p> <p>24 Q Sure, I would be happy to. The</p> <p>25 only test results reported in your report are</p>	125	<p>1 at the results and see the effect, to look at</p> <p>2 things on Wire Shark and make sure I did what</p> <p>3 I thought I did. Basically understanding how</p> <p>4 the system worked.</p> <p>5 Q If we can look back at Exhibit 6?</p> <p>6 A I'm there.</p> <p>7 Q For the 120 enabled test that you</p> <p>8 ran, you commented out 1126, is that right?</p> <p>9 A No, the 120 enabled would just be</p> <p>10 the unmodified code.</p> <p>11 Q Oh, I'm sorry. Thank you. The</p> <p>12 modified version of 2.6.31, you commented out</p> <p>13 Line 1126?</p> <p>14 A Yes.</p> <p>15 Q But you did not comment out line</p> <p>16 1125, is that right?</p> <p>17 A That's right.</p> <p>18 Q Did this introduce a memory leak?</p> <p>19 A Certainly, yes, the records are not</p> <p>20 being freed, and if they are not collected by</p> <p>21 some other mechanism, then yes, there will be</p> <p>22 a memory leak.</p> <p>23 Q The modification that you made to</p> <p>24 2.6.31, was there another process running to</p> <p>25 address that issue?</p>

126	<p>1 A No.</p> <p>2 Q As you said, the memory will fill</p> <p>3 up, right?</p> <p>4 A Presumably if you ran it long</p> <p>5 enough it might.</p> <p>6 Q How long did you run these tests</p> <p>7 that are reflected in your report?</p> <p>8 A Typically in the order of I think</p> <p>9 it was three to five minutes, somewhere m</p> <p>10 that time range.</p> <p>11 Q Were you monitoring memory?</p> <p>12 A Yes.</p> <p>13 Q Where is the corresponding results</p> <p>14 from the memory monitoring?</p> <p>15 A I don't believe I saved those. I</p> <p>16 was just monitoring to make sure that they</p> <p>17 were not out of line.</p> <p>18 Q That they were, pardon me?</p> <p>19 A That they were not out of line,</p> <p>20 that the memory was never in a shortage</p> <p>21 during the tests or even remotely close.</p> <p>22 Q Did you monitor the memory for any</p> <p>23 other information?</p> <p>24 A I was just looking at the amount of</p> <p>25 available in free memory.</p>	128	<p>1 perform.</p> <p>2 Q But you will agree that a memory</p> <p>3 leak can impair processing speed, right?</p> <p>4 A Under certain circumstances, yes.</p> <p>5 Q Can you turn to page 99 in your</p> <p>6 report, please?</p> <p>7 A I'm there.</p> <p>8 Q Starting at page 99 and going to</p> <p>9 page 101, you have three graphs, is that</p> <p>10 right?</p> <p>11 A Yes.</p> <p>12 Q What's the difference between these</p> <p>13 three graphs and I don't mean in terms of</p> <p>14 what the lines show, but in terms of what you</p> <p>15 are trying to reflect?</p> <p>16 A I am showing or what varies between</p> <p>17 them are the conditions in terms of the</p> <p>18 repeat and the set size settings.</p> <p>19 Q If we look at Appendix H, Column C</p> <p>20 has the IP address working set?</p> <p>21 A Yes.</p> <p>22 Q Is that intended to correspond with</p> <p>23 set equals 12,500 in Fig. 1?</p> <p>24 A Yes.</p> <p>25 Q Then, for Fig. 2, on page 100, is</p>
127	<p>1 Q As you sit here today, you don't</p> <p>2 have the reports on the memory utilization</p> <p>3 that you monitored while these tests were</p> <p>4 running?</p> <p>5 A I would have to look back and see</p> <p>6 if I have some of them. It's certainly</p> <p>7 possible, but I am not certain one way or</p> <p>8 other.</p> <p>9 Q As you were running these tests</p> <p>10 every three to five minutes, you were not</p> <p>11 recording information as to the memory?</p> <p>12 A No, I was recording it. I am just</p> <p>13 not certain whether I saved that information</p> <p>14 or not.</p> <p>15 Q When you were running the tests</p> <p>16 with the modified 2.6.31, you didn't look for</p> <p>17 any impact of this memory leak on the tests?</p> <p>18 A I looked to see if memory was</p> <p>19 given, and remotely close to being in short</p> <p>20 supply and it was not.</p> <p>21 Q Was it your intention to create a</p> <p>22 memory leak with this test?</p> <p>23 A I certainly knew that that is what</p> <p>24 it would do. My intention was to make it</p> <p>25 perform as fast as I thought it could</p>	129	<p>1 that where it says, "Set equals 25,000," is</p> <p>2 that also intended to correspond with Column</p> <p>3 C in Appendix H starting at Row 41?</p> <p>4 A Well, it wouldn't be Row 41, no.</p> <p>5 You have to also look at Column B.</p> <p>6 Q What does Column B tell me?</p> <p>7 A The repeat count is Column B.</p> <p>8 Q If we look at Fig. 1 on page 99,</p> <p>9 and you have got "performance rate advantage</p> <p>10 percentage" there on the left, do you see</p> <p>11 that?</p> <p>12 A I do.</p> <p>13 Q What is being analyzed on that</p> <p>14 access?</p> <p>15 A That should be Column J of, I</p> <p>16 believe, it is Appendix H.</p> <p>17 Q The variables that are included in</p> <p>18 Column J are what?</p> <p>19 A I'm not sure I understand the</p> <p>20 question.</p> <p>21 Q I'm just trying to understand what</p> <p>22 variables are going into the performance rate</p> <p>23 advantage percentage?</p> <p>24 A It should be Column J.</p> <p>25 Q Column J is measuring what?</p>