



Appium Logging - Deep Dive into Mobile Automation Logs

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Master the Mining of Mobile Automation Logs

Deep Dive into Appium Logging

① Errors Happen



② Worse Errors Happen

Why Log?

While an automation session is occurring,
Often this streaming slew of

we observe a ton of information firehosing by.
information looks rather random, absurd,



and even awful.

Engineering is like a journey through a dark tunnel filled with potholes.
Experience and tooling are like the flashlight that lets you avoid pitfalls.

Errors are going to err! -- they just happen in the real world.

Fear not! There is a way to turn something **awful/handful** into something **awesome/handsome** -- something informative and useful. It is possible to find the needle in the haystack. All it takes is a little effort.

① Errors Happen

Navigate users to existing solutions



② Worse Errors Happen

Help debug more intricate problems

We can tame the perceived randomness and absurdity by digging into an issue and solving it on our own, or at least take a dig in the direction of a potential solution.



“
*Although the threads ... have often seemed knotted ...
On the other side of the embroidery ...*

There is a crown “

Corrie Ten Baum

Image Source: <https://virtualtour.corrietenboom.com/>



① Errors Happen

Navigate users to existing solutions

For the known existing errors, Appium logs steer you in the direction of the stack trace which contains instructions for the problem mitigation.

- A particular command might trigger a long stream of logs.
 - ◆ E.g., we attempt to start a session with SDK 18.0 (or any other yet-unreleased version) on an iOS simulator.
- If your issue is more complicated - e.g., related to Chrome or ChromeDriver - Appium logs will point you to the documentation pages which explain how to fix it. It's something that doesn't need to escalate beyond reading the logs.
- Appium logs are verbose and show everything that Appium is doing or trying to do. Often you can look for errors or warnings in these logs and get a hint about something that went wrong.



Navigate users to existing solutions (continued)

[for simple obvious issues]



```
[HTTP] --> POST /session
[HTTP] {"capabilities": {"firstMatch": {}, "alwaysMatch": {"platformName": "iOS", "appium:platformVersion": "17.0", "appium:deviceName": "iPhone 13", "appium:automationName": "XCUITest", "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip", "appium:eventTimings": true}}}
[debug] [AppiumDriver@4f35] Calling AppiumDriver.createSession() with args:
[null,null,{"firstMatch":{}}, {"alwaysMatch": {"platformName": "iOS", "appium:platformVersion": "17.0", "appium:deviceName": "iPhone 13", "appium:automationName": "XCUITest", "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip", "appium:eventTimings": true}}]
[debug] [AppiumDriver@4f35] Event 'newSessionRequested' logged at 1691484598890 (01:49:58 GMT-0700 (Pacific Daylight Time))
[Appium] Attempting to find matching driver for automationName 'XCUITest' and platformName 'iOS'
[Appium] The 'xcuitest' driver was installed and matched caps.
[Appium] Will require it at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[debug] [Appium] Requiring driver at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[AppiumDriver@4f35] Appium v2.0.1 creating new XCUITestDriver (v4.33.2) session
[AppiumDriver@4f35] Checking BaseDriver versions for Appium and XCUITestDriver
[AppiumDriver@4f35] Appium's BaseDriver version is 9.3.16
[AppiumDriver@4f35] XCUITestDriver's BaseDriver version is 9.3.16
[debug] [XCUITestDriver@01e8] Creating session with W3C capabilities:
[debug] [XCUITestDriver@01e8]   "alwaysMatch": {
[debug] [XCUITestDriver@01e8]     "platformName": "iOS",
[debug] [XCUITestDriver@01e8]     "appium:platformVersion": "17.0",
[debug] [XCUITestDriver@01e8]     "appium:deviceName": "iPhone 13",
[debug] [XCUITestDriver@01e8]     "appium:automationName": "XCUITest",
[debug] [XCUITestDriver@01e8]     "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip",
[debug] [XCUITestDriver@01e8]     "appium:eventTimings": true
[debug] [XCUITestDriver@01e8]   },
[debug] [XCUITestDriver@01e8]   "firstMatch": [
[debug] [XCUITestDriver@01e8]   {}
[debug] [XCUITestDriver@01e8]   ]
[debug] [XCUITestDriver@01e8] ]
[XCUITestDriver@01e8 (fa5517b0)] Session created with session id: fa5517b0-67c5-4da3-9cb4-c4c158e26626
[debug] [XCUITest] Current user: 'lanabegunova'
[XCUITestDriver@01e8 (fa5517b0)] iOS SDK Version set to '16.4'
[XCUITestDriver@01e8 (fa5517b0)] {}
[DevCon Factory] Neither device UDID nor local port is set. Did not know how to release the connection
[debug] [AppiumDriver@4f35] Event 'newSessionStarted' logged at 1691484599007 (01:49:59 GMT-0700 (Pacific Daylight Time))
[debug] [AppiumDriver@4f35] Encountered internal error running command: Error: '17.0' does not exist in the list of simctl SDKs. Only the following Simulator SDK versions are available on your system: 16.4, 16.2, 15.5
[debug] [AppiumDriver@4f35]   at Simctl.getDevices ('/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/node_modules/node-simctl/lib/subcommands/list.js:171:9')
[debug] [AppiumDriver@4f35]   at getExistingSim ('/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/simulator-management.js:122:52')
[debug] [AppiumDriver@4f35]   at XCUITestDriver.determineDevice ('/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/driver.js:1298:22')
[debug] [AppiumDriver@4f35]   at XCUITestDriver.start ('/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/driver.js:488:49')
[debug] [AppiumDriver@4f35]   at XCUITestDriver.createSession ('/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/driver.js:404:7')
[debug] [AppiumDriver@4f35]   at AppiumDriver.createSession ('/usr/local/lib/node_modules/appium/lib/appium.js:352:35')
[HTTP] <- POST /session 500 118 ms - 776
```

② Worse Errors Happen

Help debug more elaborate problems

Worse things do happen!

Some errors cannot be fixed quickly and easily.



- Such a log is less human-readable and yields no clear meaning to a person who's unfamiliar with the codebase.
- However, the person who does know the codebase would have no way of resolving your issue/problem without this information.
- If ① you feel like jumping into the codebase, which is rather sizable, plus ② you have the exact line number -- you can continue your investigation or hand it off to somebody else in your team.
- Either somebody else or yourself knows the *exact line* to go and solve your problem.
- Without it, you'd be *looking for a needle in a haystack!*

Help debug more elaborate problems (continued)

[dive into codebase]

```
[HTTP] --> POST /session
[HTTP] {"capabilities": {"firstMatch": {}, "alwaysMatch": {"platformName": "iOS", "appium:platformVersion": "17.0", "appium:deviceName": "iPhone 13", "appium:automationName": "XCUITest", "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip", "appium:eventTimings": true}}}
[debug] [AppiumDriver@4f35] Calling AppiumDriver.createSession() with args:
[null,null,{"firstMatch":{}}, {"alwaysMatch": {"platformName": "iOS", "appium:platformVersion": "17.0", "appium:deviceName": "iPhone 13", "appium:automationName": "XCUITest", "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip", "appium:eventTimings": true}}]
[debug] [AppiumDriver@4f35] Event 'newSessionRequested' logged at 1691484598890 (01:49:58 GMT-0700 (Pacific Daylight Time))
[Appium] Attempting to find matching driver for automationName 'XCUITest' and platformName 'iOS'
[Appium] The 'xcuitest' driver was installed and matched caps.
[Appium] Will require it at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[debug] [Appium] Requiring driver at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[AppiumDriver@4f35] Appium v2.0.1 creating new XCUITestDriver (<v4.33.2>) session
[AppiumDriver@4f35] Checking BaseDriver versions for Appium and XCUITestDriver
[AppiumDriver@4f35] Appium's BaseDriver version is 9.3.16
[AppiumDriver@4f35] XCUITestDriver's BaseDriver version is 9.3.16
[debug] [XCUITestDriver@01e8] Creating session with W3C capabilities:
[debug] [XCUITestDriver@01e8]   "alwaysMatch": {
[debug] [XCUITestDriver@01e8]     "platformName": "iOS",
[debug] [XCUITestDriver@01e8]     "appium:platformVersion": "17.0",
[debug] [XCUITestDriver@01e8]     "appium:deviceName": "iPhone 13",
[debug] [XCUITestDriver@01e8]     "appium:automationName": "XCUITest",
[debug] [XCUITestDriver@01e8]     "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip",
[debug] [XCUITestDriver@01e8]     "appium:eventTimings": true
[debug] [XCUITestDriver@01e8]   },
[debug] [XCUITestDriver@01e8]   "firstMatch": [
[debug] [XCUITestDriver@01e8]   {}
[debug] [XCUITestDriver@01e8] ]
[debug] [XCUITestDriver@01e8] }
[XCUITestDriver@01e8 (fa5517b0)] Session created with session id: fa5517b0-67c5-4da3-9cb4-c4c158e26626
[debug] [XCUITest] Current user: 'lanabegunova'
[XCUITestDriver@01e8 (fa5517b0)] iOS SDK Version set to '16.4'
[XCUITestDriver@01e8 (fa5517b0)] {}
[DevCon Factory] Neither device UDID nor local port is set. Did not know how to release the connection
[debug] [AppiumDriver@4f35] Event 'newSessionStarted' logged at 1691484599007 (01:49:59 GMT-0700 (Pacific Daylight Time))
[debug] [AppiumDriver@4f35] Encountered internal error running command: Error: '17.0' does not exist in the list of simctl SDKs. Only the following Simulator SDK versions are available on your system: 16.4, 16.2, 15.5
[debug] [AppiumDriver@4f35]      at Simctl.getDevices
(/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/node_modules/node-simctl/lib/subcommands/list.js:171:9)
[debug] [AppiumDriver@4f35]      at getExistingSim (/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/simulator-management.js:122:52)
[debug] [AppiumDriver@4f35]      at XCUITestDriver.determineDevice
(/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/driver.js:1298:22)
[debug] [AppiumDriver@4f35]      at XCUITestDriver.start (/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/driver.js:488:40)
[debug] [AppiumDriver@4f35]      at XCUITestDriver.createSession (/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/lib/driver.js:404:7)
[debug] [AppiumDriver@4f35]      at AppiumDriver.createSession (/usr/local/lib/node_modules/appium/lib/appium.js:352:35)
[HTTP] <- POST /session 500 118 ms - 776
```



Server Startup

First and foremost, the *version of Appium*, as well as the *IP address* and *port number* it's running on:

```
% appium
[Appium] Welcome to Appium v2.0.1
[Appium] Attempting to load driver xcuitest/uiautomator2 . . .
[Appium] Appium REST http interface listener started on http://0.0.0.0:4723
[Appium] You can provide the following URLs in your client code to connect to this server:
[Appium]     http://127.0.0.1:4723/ (only accessible from the same host)
[Appium]     http://10.0.0.76:4723/
[Appium] Available drivers: . . .
```



Session Creation

- Session creation involves a complicated series of operations that get the environment set up and the AUT running.
- Typically, the beginning of the logs for the session creation command contains basic information about that session.
- Specifically, you can view and monitor the [capabilities](#) (caps) and/or any [special flags](#), including [default capabilities](#). When you start the server, they'll be shown in the log to help you understand which environment has spun up.

```
% appium --address 192.168.232.2 --port 8000 --default-capabilities '{"appium:eventTimings": true}'  
[Appium] Welcome to Appium v2.0.1  
[Appium] Non-default server args:  
[Appium] {  
[Appium]   address: '192.168.232.2',  
[Appium]   port: 8000  
[Appium] }  
[Appium] Default capabilities, which will be added to each request unless overridden by desired capabilities:  
[Appium] {  
[Appium]   appium:eventTimings: true  
[Appium] }  
[Appium] Appium REST http interface listener started on 192.168.232.2 8000
```

- These caps are what the automated session acts upon. Hence, it's useful to verify that the Appium server actually receives what's intended in the request.
 - This information is crucial for providing the [context](#) of the test [automation](#) to be run.
 - Knowing what version of Appium is running is vital, in order to start debugging and getting to the root cause of an issue in any particular run.
 - Each version has its own varying capacities and limitations.
-
- There are always problems to handle. Changing a capability may solve the issue, or it may generate a new problem instead. A lot of these problems have to do with the [context](#).
 - The [session creation](#) sets up the [context of your automation](#).
 - Stepping through the session creation example helps with understanding the flow and obviating what gets logged.



Context for an Automation Session

- All commands operate within a specific environment, which is determined at the time of `session creation`.
- Logs can be long and tedious - for a basic session startup, there may be 100+ lines of code.
- Dedicate time to *parse and extract relevant information* from the logs.
- Obtain understanding of both high-level and granular-detail information which Appium logs generate.

```
[AppiumDriver@8964] Appium v2.0.1 creating new XCUITestDriver (v4.33.2) session
[AppiumDriver@8964] Checking BaseDriver versions for Appium and XCUITestDriver
[AppiumDriver@8964] Appium's BaseDriver version is 9.3.16
[AppiumDriver@8964] XCUITestDriver's BaseDriver version is 9.3.16
[debug] [XCUITestDriver@b3d5] Creating session with W3C capabilities: {
[debug] [XCUITestDriver@b3d5]   "alwaysMatch": {
[debug] [XCUITestDriver@b3d5]     "platformName": "iOS",
[debug] [XCUITestDriver@b3d5]     "appium:app": "/Users/lanabegunova/code/apps/TheApp.app.zip",
[debug] [XCUITestDriver@b3d5]     "appium:platformVersion": "16.4",
[debug] [XCUITestDriver@b3d5]     "appium:deviceName": "iPhone 14",
[debug] [XCUITestDriver@b3d5]     "appium:automationName": "XCUITest",
[debug] [XCUITestDriver@b3d5]     "appium:noReset": "true",
[debug] [XCUITestDriver@b3d5]     "appium:maxTypingFrequency": "30",
[debug] [XCUITestDriver@b3d5]     "appium:clearSystemFiles": "true",
[debug] [XCUITestDriver@b3d5]     "appium:showXcodeLog": "false"
[debug] [XCUITestDriver@b3d5]   },
[debug] [XCUITestDriver@b3d5]   "firstMatch": [
[debug] [XCUITestDriver@b3d5]     {}
[debug] [XCUITestDriver@b3d5]   ]
[debug] [XCUITestDriver@b3d5] }
[XCUITestDriver@b3d5 (a301137c)] Session created with session id: 3382817b-a951-4c9e-843d-aaa6228e9ee5
```

- So we look at our log and realize it's actually informative, not intimidating.
- In this example, I ran a simple session creation for iOS and ended up with 100+lines of logs. This seems excessive, but it's necessary.
- This example is specific to an iOS simulator. However, the things that Appium does in a session startup are the same for either Android or iOS, real or virtual devices. It does the same things that we need to get to the right device, configure the device as we want it, etc.



Error Investigation

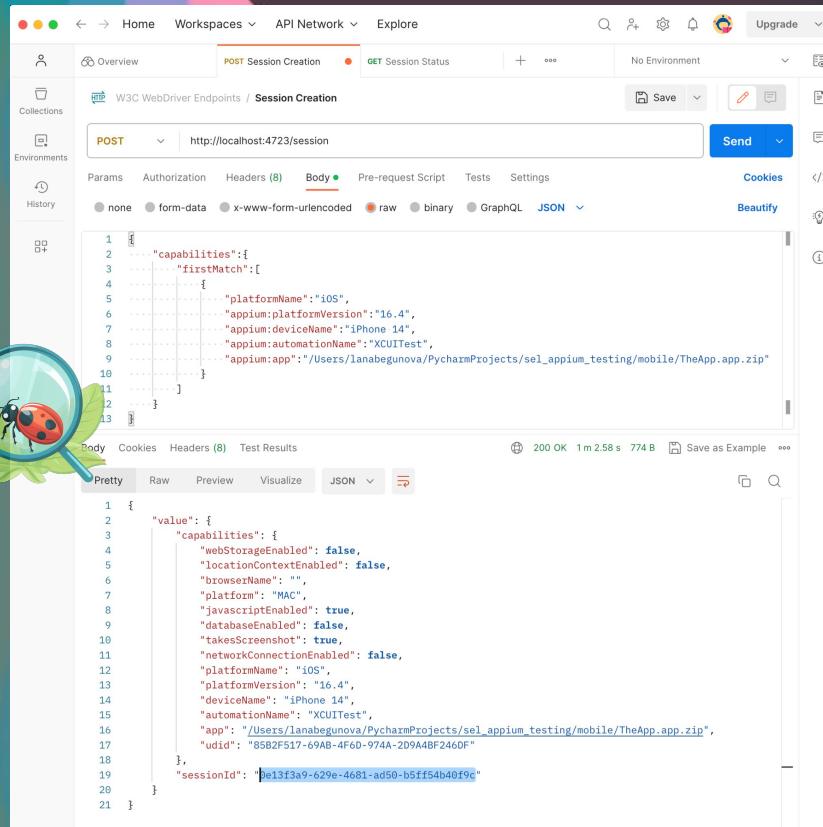
- Appium is a REST API server, which accepts incoming HTTP requests, performs the action requested, and returns a result of some sort.
- In the Appium server logs, each incoming request is marked with line `[HTTP] -->`, and each response is marked with line `[HTTP]<--`.
- When investigating a problem, read through the logs for the session. Check that the values coming in from the client are what you expect.



```
[HTTP] --> GET /status
[HTTP] {}
[debug] [AppiumDriver@12a7] Calling AppiumDriver.getStatus() with args: []
[debug] [AppiumDriver@12a7] Responding to client with driver.getStatus()
result: {"build":{"version":"2.0.1"}}
[HTTP] <-- GET /status 200 1 ms - 39
```

- Usually, errors show at the end of the automation session. But sometimes the session keeps going, so your error logs might be showing earlier.
- Identify the command where the error happened. Each command is marked with `[HTTP] ->` and `[HTTP]<- -`. Within these markers are the details of command execution including any error output.

Session Startup



The screenshot shows the Postman application interface. At the top, there are tabs for Home, Workspaces, API Network, and Explore. Below the tabs, there are sections for Overview, POST Session Creation, and GET Session Status. The main area displays a POST request to `http://localhost:4723/session`. The Body tab contains JSON code for session creation:

```
1 {  
2     "capabilities": {  
3         "firstMatch": [  
4             {  
5                 "platformName": "iOS",  
6                 "appium:platformVersion": "16.4",  
7                 "appium:deviceName": "iPhone 14",  
8                 "appium:automationName": "XCUITest",  
9                 "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip"  
10            ]  
11        }  
12    }  
13 }
```

Below the request, the Response section shows a 200 OK status with a response time of 1m 2.58s and a body size of 774 B. The response JSON is identical to the request's body. A magnifying glass icon with a ladybug is overlaid on the left side of the interface.

- iOS startup (and every single command) begins with this line: [HTTP] -->
- This is the sign of the command coming in, i.e. of the *request* coming in from the *client*.
- If this line doesn't show, then something happened between the *client* and the server. Then Appium had no way of executing the command, because it never received it.
- Further, we always get all the arguments the client has sent to the server. Here you can detect any miscommunication – if the client does anything wonky with your capabilities in this case or with an argument in general – and fix the problem from there.

[HTTP] --> POST /session

```
[HTTP] {"capabilities": {"firstMatch": [{"platformName": "iOS", "appium:platformVersion": "16.4", "appium:deviceName": "iPhone 14", "appium:automationName": "XCUITest", "appium:app": "/Users/lanabegunova/code/apps/TheApp.app.zip"}]}}
```

- You can start a session as a client via your code in the IDE, using curl, or tools like Postman/Insomnia.
- Use W3C WebDriver Endpoints to send various requests.
- Make sure to launch the Appium server beforehand.

Session Startup - Automation Context/Basis

- Then, the startup logs display the basis for our automation - not only the desired capabilities that we sent when we requested the session, but also any default capabilities that were set at the command line.
- The Capabilities set of lines is exactly what Appium is going to try to set up in order for us to run our automation.
- These lines differ, depending on what we send in. But they will also change, if you happen to accidentally set default capabilities in lieu of setting your desired command timeout of 1 second. You can detect such an omission within these lines and fix it.

```
[debug] [AppiumDriver@4f35] Event 'newSessionRequested' logged at 1691484539523 (01:48:59 GMT-0700 (Pacific Daylight Time))
[Appium] Attempting to find matching driver for automationName 'XCUITest' and platformName 'iOS'
[Appium] The 'xcuitest' driver was installed and matched caps.
[Appium] Will require it at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[debug] [Appium] Requiring driver at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[XCUITestDriver@a429] Appium v2.0.1 creating new XCUITestDriver (v4.33.2) session
[XCUITestDriver@a429] Checking BaseDriver versions for Appium and XCUITestDriver
[XCUITestDriver@a429] Appium's BaseDriver version is 9.3.16
[XCUITestDriver@a429] XCUITestDriver's BaseDriver version is 9.3.16
[debug] [XCUITestDriver@a429] Creating session with W3C capabilities: {
[debug] [XCUITestDriver@a429]   "alwaysMatch": {
[debug] [XCUITestDriver@a429]     "platformName": "iOS",
[debug] [XCUITestDriver@a429]     "appium:platformVersion": "16.4",
[debug] [XCUITestDriver@a429]     "appium:deviceName": "iPhone 13",
[debug] [XCUITestDriver@a429]     "appium:automationName": "XCUITest",
[debug] [XCUITestDriver@a429]     "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip",
[debug] [XCUITestDriver@a429]     "appium:eventTimings": "true",
[debug] [XCUITestDriver@a429]     "appium:LaunchTimeout": "30000"
[debug] [XCUITestDriver@a429]   },
[debug] [XCUITestDriver@a429]   "firstMatch": [
[debug] [XCUITestDriver@a429]     {}
[debug] [XCUITestDriver@a429]   ]
[debug] [XCUITestDriver@a429] }
[XCUITestDriver@a429 (00e7d054)] Session created with session id: 00e7d054-f0a2-4471-adef-9001e502650c
```



Versions of Appium and Drivers

- Before the Capabilities, we have an indication of what slice of the codebase we deal with.
- If we encounter an error and we don't know what versions of Appium and the driver we're using, then there's nothing we can do.
Because the line number corresponds to a particular line in a particular version.
And everything changes in accordance with the respective versions.
- If a new version adds a line, the line number also changes in the logs. Having a version number is important!

```
[debug] [AppiumDriver@619a] Event 'newSessionRequested' logged at 1691388667425 (23:11:07 GMT-0700 (Pacific Daylight Time))
[Appium] Attempting to find matching driver for automationName 'XCUITest' and platformName 'iOS'
[Appium] The 'xcuitest' driver was installed and matched caps.
[Appium] Will require it at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[debug] [Appium] Requiring driver at /Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver
[AppiumDriver@619a] Appium v2.0.1 creating new XCUI TestDriver (v4.33.2) session
[AppiumDriver@619a] Checking BaseDriver versions for Appium and XCUI TestDriver
[AppiumDriver@619a] Appium's BaseDriver version is 9.3.16
[AppiumDriver@619a] XCUI TestDriver's BaseDriver version is 9.3.16
[debug] [XCUI TestDriver@f3ce] Creating session with W3C capabilities: {
[debug] [XCUI TestDriver@f3ce]   "alwaysMatch": {
[debug] [XCUI TestDriver@f3ce]     "platformName": "iOS",
[debug] [XCUI TestDriver@f3ce]     "appium:platformVersion": "15.5",
[debug] [XCUI TestDriver@f3ce]     "appium:deviceName": "iPhone 13",
[debug] [XCUI TestDriver@f3ce]     "appium:automationName": "XCUI Test",
[debug] [XCUI TestDriver@f3ce]     "appium:app": "/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip"
[debug] [XCUI TestDriver@f3ce]   },
[debug] [XCUI TestDriver@f3ce]   "firstMatch": [
[debug] [XCUI TestDriver@f3ce]     {}
[debug] [XCUI TestDriver@f3ce]   ]
[debug] [XCUI TestDriver@f3ce] }

[XCUI TestDriver@f3ce (7e1813d9)] Session created with session id: 7e1813d9-bf49-4765-8c25-9707ca4a0574
[debug] [XCUI Test] Current user: 'lanabegunova'
[XCUI TestDriver@f3ce (7e1813d9)] iOS SDK Version set to '16.4'
[debug] [XCUI Test] Looking for an existing Simulator with platformName: iOS, platformVersion: 15.5, deviceName: iPhone 13
[iOSsim] Constructing iOS simulator for Xcode version 14.3.1 with udid '15D61E09-9554-458E-AEBB-2D0A1A9E811F'
```

- Both Android and iOS automation works depending on the tools that are installed on your machine. For iOS, knowing [Xcode](#) and the tools involved with Xcode is important. For Android, knowing the SDK version, what ADB is running, etc., is necessary.
- Every version has its own set of problems and limitations.
- The logs provide information about the exact environment. This may seem trivial, but it's essential in order to reproduce and solve problems.



Verify Device, AUT, Bundle ID (iOS) / Package Name (Android)

- In every test we have to determine a device.

```
[iOSSim] Constructing iOS simulator for Xcode version 14.3.1 with udid 15D61E09-9554-458E-AEBB-2D0A1A9E811F'  
[XCUITestDriver@e204 (3382817b)] Determining device to run tests on: udid: '15D61E09-9554-458E-AEBB-2D0A1A9E811F', real device: false
```

- We also need to go through the app to make sure the app actually exists.

These sorts of errors happen all the time - when you have a path wrong or the app has a different name in the build, etc.

- Moreover, the Bundle ID - we're getting the info about what we're going to run.

```
[BaseDriver] Using local app '/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip'  
[debug] [Support] Found 'unzip' at '/usr/bin/unzip'  
[debug] [XCUITestDriver@0405 (6f0378af)] Found 1 bundle in 'TheApp.app.zip': TheApp.app  
[XCUITestDriver@0405 (6f0378af)] 'TheApp.app' is the resulting application bundle selected from  
'/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip'  
[debug] [XCUITestDriver@0405 (6f0378af)] Event 'appConfigured' logged at 1691388919179 (23:15:19 GMT-0700 (Pacific Daylight Time))  
[debug] [XCUICTest] Checking whether app '/var/folders/lp/90pl5j4j4k99kqz5x3_crr3h0000gn/T/202376-99102-1a864i.wgpy/TheApp.app' is actually present  
on file system  
[debug] [XCUICTest] App is present  
[debug] [XCUICTest] Getting bundle ID from app '/var/folders/lp/90pl5j4j4k99kqz5x3_crr3h0000gn/T/202376-99102-1a864i.wgpy/TheApp.app':  
'io.cloudgrey.the-app'  
[debug] [XCUITestDriver@0405 (6f0378af)] Event 'resetStarted' logged at 1691388919180 (23:15:19 GMT-0700 (Pacific Daylight Time))  
[XCUICTest] Not scrubbing third party app in anticipation of uninstall  
[debug] [XCUITestDriver@0405 (6f0378af)] Event 'resetComplete' logged at 1691388919308 (23:15:19 GMT-0700 (Pacific Daylight Time))
```



Device Settings, App Installation

- Both Android and iOS need to set up the device itself the way you want it.
- If you send in a particular setting/preference for the device - e.g., you want to make sure that the device gets a particular keyboard - then you need to set it up by going through a series of steps.

```
[XCUITestDriver@f3ce (7e1813d9)] Setting up simulator
[debug] [iOSSim] Setting preferences of 15D61E09-9554-458E-AEBB-2D0A1A9E811F Simulator to {"ConnectHardwareKeyboard":false}
[debug] [iOSSim] Setting common Simulator preferences to {"RotateWindowWhenSignaledByGuest":true,"StartLastDeviceOnLaunch":false,"DetachOnWindowClose":false,
"AttachBootedOnStart":true,"ConnectHardwareKeyboard":false,"PasteboardAutomaticSync":false}
[debug] [iOSSim] Updated 15D61E09-9554-458E-AEBB-2D0A1A9E811F Simulator preferences at '/Users/lanabegunova/Library/Preferences/com.apple.iphonesimulator.plist' with
{"RotateWindowWhenSignaledByGuest":true,"StartLastDeviceOnLaunch":false,"DetachOnWindowClose":false,"AttachBootedOnStart":true,"ConnectHardwareKeyboard":false,"Pasteboard
AutomaticSync":false,"DevicePreferences":{"15D61E09-9554-458E-AEBB-2D0A1A9E811F":{"SimulatorExternalDisplay":2114,"ConnectHardwareKeyboard":false,"ChromeTint":""}}}
[debug] [iOSSim] Got Simulator UI client PID: 97255
[iOSSim] Both Simulator with UDID '15D61E09-9554-458E-AEBB-2D0A1A9E811F' and the UI client are currently running
[debug] [XCUITestDriver@f3ce (7e1813d9)] Event 'simStarted' logged at 1691388669139 (23:11:09 GMT-0700 (Pacific Daylight Time))
```

- You need to install the app, unless it's a web test.

```
[debug] [XCUITest] Installing '/var/folders/lp/90p15j4j4k99kqz5x3_crr3h0000gn/T/202376-99102-1a864i.wgpy/TheApp.app' on Simulator with UUID
'15D61E09-9554-458E-AEBB-2D0A1A9E811F'...
[debug] [XCUITest] The app has been installed successfully.
[debug] [XCUITestDriver@0405 (6f0378af)] Event 'appInstalled' logged at 1691388922323 (23:15:22 GMT-0700 (Pacific Daylight Time))
```



WebDriverAgent (iOS)

- In iOS, WebDriverAgent needs to be started. And the most important line is the one that says, “`Beginning test with command ...`”.
- This is the actual command that we use to start the XCUTest framework on the device. You can always run what’s in quotes here “`xcodebuild build-for-testing ...`” and see if Xcode is capable of running a test on that device without Appium.
- There are a lot of moving parts in Appium, and one of the big ones is Xcode and it often fails.
- Knowing the exact command that Appium is running allows you to look at whether Xcode is failing or whether Appium is failing somewhere along the way.



```
[XCUITestDriver@5028 (f94fe59b)] Launching WebDriverAgent on the device
[XCUITestDriver@5028 (f94fe59b)] Cleaning up the WebDriverAgent project after the module upgrade has happened (5.0.0 < 5.6.0)
[debug] [XCUITestDriver@5028 (f94fe59b)] Cleaning the project scheme 'WebDriverAgentLib' to make sure there are no leftovers from previous installs
[debug] [XCUITestDriver@5028 (f94fe59b)] Cleaning the project scheme 'WebDriverAgentRunner' to make sure there are no leftovers from previous installs
[debug] [WebDriverAgent] Killing running processes 'xcodebuild.*4F41E034-9C94-4D42-96B4-6DB59556D01E,
4F41E034-9C94-4D42-96B4-6DB59556D01E.*XCTRunner, xctest.*4F41E034-9C94-4D42-96B4-6DB59556D01E' for the device
4F41E034-9C94-4D42-96B4-6DB59556D01E...
[debug] [WebDriverAgent] 'pgrep -if 4F41E034-9C94-4D42-96B4-6DB59556D01E.*XCTRunner' didn't detect any matching processes. Return code: 1
[debug] [WebDriverAgent] 'pgrep -if xcodebuild.*4F41E034-9C94-4D42-96B4-6DB59556D01E' didn't detect any matching processes. Return code: 1
[debug] [WebDriverAgent] 'pgrep -if xctest.*4F41E034-9C94-4D42-96B4-6DB59556D01E' didn't detect any matching processes. Return code: 1
[debug] [XCUITestDriver@5028 (f94fe59b)] Beginning test with command 'xcodebuild build-for-testing test-without-building -project
/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/node_modules/appium-webdriveragent/WebDriverAgent.xcodeproj -scheme
WebDriverAgentRunner -derivedDataPath /Users/lanabegunova/Library/Developer/Xcode/DerivedData/WebDriverAgent-byyfbjgcyywjbvbjdoabvuqvhvuj
-destination id=4F41E034-9C94-4D42-96B4-6DB59556D01E IPHONEOS_DEPLOYMENT_TARGET=16.4 GCC_TREAT_WARNINGS_AS_ERRORS=0
COMPILER_INDEX_STORE_ENABLE=NO' in directory
'/Users/lanabegunova/.appium/node_modules/appium-xcuitest-driver/node_modules/appium-webdriveragent'
[debug] [XCUITestDriver@5028 (f94fe59b)] Output from xcodebuild will only be logged if any errors are present there. To change this, use
'showXcodeLog' desired capability
```

WebDriverAgent (continued) - - [polling]

- This long stream is just polling to make sure that WebDriverAgent is starting.
 - That's the only way to know it starts. For some reason, Xcode doesn't tell you it has started.
 - The only way we can tell it started is by poking it and getting it to say something back to us. And these are essentially the pokes.

WebDriverAgent (continued) - - [WDA server response]

- We eventually get a response, which means that the WebDriverAgent is running. Basically, it means that the device is capable of being automated.
- It's the same on Android, we just push a different server, like UiAutomator2 or Espresso onto the device. Once we push the driver server, we start it and poll until it's running. And that's what actually does the automation on the device - WebDriverAgent on iOS or UiAutomator2 server on Android. And then we send commands to it.
- Below captioned is the response to the command of status (are you alive?). And hopefully the eventual answer is yes.

```
[debug] [XCUITestDriver@c13c (a66cc6c5)] Event 'wdaSessionAttempted' logged at 1691477739214 (23:55:39  
GMT-0700 (Pacific Daylight Time))  
[debug] [XCUITestDriver@c13c (a66cc6c5)] Sending createSession command to WDA  
[debug] [XCUITestDriver@c13c (a66cc6c5)] Matched '/session' to command name 'createSession'  
[debug] [XCUITestDriver@c13c (a66cc6c5)] Proxying [POST /session] to [POST  
http://127.0.0.1:8100/session] with body:  
{"capabilities": {"firstMatch": [{"bundleId": "io.cloudgrey.the-app", "arguments": [], "environment": {}, "eventLoopIdleDelaySec": 0, "shouldWaitForQuiescence": true, "shouldUseTestManagerForVisibilityDetection": false, "maxTypingFrequency": 60, "shouldUseSingletonTestManager": true, "shouldTerminateApp": true, "forceAppLaunch": true, "useNativeCachingStrategy": true, "forceSimulatorSoftwareKeyboardPresence": true}], "alwaysMatch": {}}}  
[debug] [XCUITestDriver@c13c (a66cc6c5)] Got response with status 200:  
{"value": {"sessionId": "3384E98D-5ADE-4A0F-B395-2190F64A2FF9", "capabilities": {"device": "iphone", "browserName": "TheApp", "sdkVersion": "16.4", "CFBundleIdentifier": "io.cloudgrey.the-app"}}, "sessionId": "3384E98D-5A  
DE-4A0F-B395-2190F64A2FF9"}  
[XCUITestDriver@c13c (a66cc6c5)] Determined the downstream protocol as 'W3C'  
[debug] [XCUITestDriver@c13c (a66cc6c5)] Event 'wdaSessionStarted' logged at 1691477740692 (23:55:40  
GMT-0700 (Pacific Daylight Time))  
[debug] [XCUITestDriver@c13c (a66cc6c5)] Event 'wdaStarted' logged at 1691477740693 (23:55:40 GMT-0700  
(Pacific Daylight Time))
```



Session ID(s)

- We then start a session. For Android and iOS it's the same - the session gets started in the Appium server, but then also on the device we have another session. These two sessions get linked together.
- And ultimately we hopefully get a notice that everything has successfully started.

```
[debug] [XCUITestDriver@f46d (506770e4)] Event 'wdaSessionAttempted' logged at 1691701542577 (14:05:42 GMT-0700 (Pacific Daylight Time))
[debug] [XCUITestDriver@f46d (506770e4)] Sending createSession command to WDA
[debug] [XCUITestDriver@f46d (506770e4)] Matched '/session' to command name 'createSession'
[debug] [XCUITestDriver@f46d (506770e4)] Proxying [POST /session] to [POST http://127.0.0.1:8100/session] with body:
{"capabilities":{"firstMatch":[{"bundleId":"io.cloudgrey.the-app","arguments":[],"environment":{},"eventLoopIdleDelaySec":0,"shouldWaitForQuiescence":true,"shouldUseTestManagerForVisibilityDetection":false,"maxTypingFrequency":60,"shouldUseSingletonTestManager":true,"shouldTerminateApp":true,"forceAppLaunch":true,"useNativeCachingStrategy":true,"forceSimulatorSoftwareKeyboardPresence":true}],"alwaysMatch":{}}}
[debug] [XCUITestDriver@f46d (506770e4)] Got response with status 200:
{"value":{"sessionId":"C386DBFA-FC1B-4088-A1D4-BAC05B2B972B","capabilities":{"device":"iphone","browserName":"TheApp","sdkVersion":"16.4","CFBundleIdentifier":"io.cloudgrey.the-app"}}, "sessionId":"C386DBFA-FC1B-4088-A1D4-BAC05B2B972B"}
[XCUITestDriver@f46d (506770e4)] Determined the downstream protocol as 'W3C'
[debug] [XCUITestDriver@f46d (506770e4)] Event 'wdaSessionStarted' logged at 1691701544041 (14:05:44 GMT-0700 (Pacific Daylight Time))
[debug] [BaseDriver] The value of 'elementResponseAttributes' setting did not change. Skipping the update for it
[debug] [BaseDriver] The value of 'shouldUseCompactResponses' setting did not change. Skipping the update for it
[AppiumDriver@4d7a] New XCUITestDriver session created successfully, session 506770e4-afd9-4d79-834e-90af4b129104
added to master session list
[debug] [AppiumDriver@4d7a] Event 'newSessionStarted' logged at 1691701544043 (14:05:44 GMT-0700 (Pacific Daylight Time))
[debug] [XCUITestDriver@f46d (506770e4)] Cached the protocol value 'W3C' for the new session 506770e4-afd9-4d79-834e-90af4b129104
[debug] [XCUITestDriver@f46d (506770e4)] Responding to client with driver.createSession() result:
{"capabilities":{"webStorageEnabled":false,"locationContextEnabled":false,"browserName":"","platform":"MAC","javascriptEnabled":true,"databaseEnabled":false,"takesScreenshot":true,"networkConnectionEnabled":false,"platformName":"iOS","platformVersion":"16.4","deviceName":"iPhone 14","automationName":"XCUITest",
"app":"/Users/lanabegunova/PycharmProjects/sel_appium_testing/mobile/TheApp.app.zip",
"udid":"85B2F517-69AB-4F6D-974A-2D9A4BF246DF"}}
```



HTTP Log Lines - Request/Response Schema

[HTTP] <-- POST /session 200 72625 ms - 525

- This means that there's a response, and the server is sending that response back.
 - The logs can be parsed out by the incoming request [HTTP] --> and outgoing response [HTTP] <--.
 - Everything in between the request and response lines are the logs for one single command.

[HTTP] --> POST /command

↳ Every command starts with an HTTP request from the client...

... command logs ...

[HTTP] <-- POST /command 200 5056 ms - 505

[HTTP] --> GET /session/f94fe59b-20b9-480a-9823-b36807c5c644/source

```
[HTTP {}]
[debug] [XCUITestDriver@5028 (f94fe59b)] Calling AppiumDriver.getPageSource() with args: ["f94fe59b-20b9-480a-9823-b36807c5c644"]
[debug] [XCUITestDriver@5028 (f94fe59b)] Executing command 'getPageSource'
[debug] [XCUITestDriver@5028 (f94fe59b)] Matched '/source?scope=AppiumAUT' to command name 'getPageSource'
[debug] [XCUITestDriver@5028 (f94fe59b)] Proxying [GET /source?scope=AppiumAUT] to [GET http://127.0.0.1:8100/session/DC85AAFA-0657-4E04-83FE-B6CF6BA08225/source?scope=AppiumAUT] with no body
[debug] [XCUITestDriver@5028 (f94fe59b)] Got response with status 200: {"value": "<?xml version='1.0'?>\n<AppiumAUT>\n  <XCUIElementTypeApplication type='XCUIElementTypeApplication'\n    name='TheApp'\n    label='TheApp'\n    enabled='true'\n    visible='true'\n    accessible='false'\n    x='0'\n    y='0'\n    width='375'\n    height='812'\n    index='0'\n  </XCUIElementTypeWindow\n  <XCUIElementTypeOther type='XCUIElementTypeNavigationBar'\n    name='TheApp'\n    enabled='true'\n    visible='true'\n    accessible='false'\n    x='0'\n    y='0'\n    width='375'\n    height='812'\n    index='0'\n  </XCUIElementTypeNavigationBar>\n  <XCUIElementTypeStaticText type='XCUIElementTypeStaticText'\n    value='The App'\n    name='The App'\n    label='The App'\n    enabled='true'\n    visible='true'\n    accessible='true'\n    x='154'\n    y='44'\n  </XCUIElementTypeStaticText>\n</AppiumAUT>"}
[debug] [XCUITestDriver@5028 (f94fe59b)] Responding to client with driver.getPageSource() result: {"value": "<?xml version='1.0'?>\n<AppiumAUT>\n  <XCUIElementTypeApplication type='XCUIElementTypeApplication'\n    name='TheApp'\n    label='TheApp'\n    enabled='true'\n    visible='true'\n    accessible='false'\n    x='0'\n    y='0'\n    width='375'\n    height='812'\n    index='0'\n  </XCUIElementTypeWindow\n  <XCUIElementTypeOther type='XCUIElementTypeWindow'\n    name='TheApp'\n    label='TheApp'\n    enabled='true'\n    visible='true'\n    accessible='false'\n    x='0'\n    y='0'\n    width='375'\n    height='812'\n    index='0'\n  </XCUIElementTypeOther\n  <XCUIElementTypeNavigationBar type='XCUIElementTypeNavigationBar'\n    name='TheApp'\n    label='The App'\n    enabled='true'\n    visible='true'\n    accessible='false'\n    x='0'\n    y='44'\n    width='375'\n    height='44'\n    index='0'\n  </XCUIElementTypeNavigationBar>\n  <XCUIElementTypeStaticText type='XCUIElementTypeStaticText'\n    value='The App'\n    name='The App'\n    label='The App'\n    enabled='true'\n    visible='true'\n    accessible='true'\n    x='154'\n    y='44'\n  </XCUIElementTypeStaticText>\n</AppiumAUT>"}
```

[HTTP] <-- GET /session/f94fe59b-20b9-480a-9823-b36807c5c644/source 200 273 ms - 8281



Conclusion

- Any time you're looking at a problem that happened - even if you just look at the specifics of the command - the command in the logs is gated by the two lines that are both prefixed with [HTTP]:
 - ◆ The line for the request coming in, with the respective method (e.g., POST/GET, or DELETE for ending a session), then the URL to that command.
 - ◆ Then we get the return method, with the same name, same URL, and some info, e.g., about the status of that command.

```
[HTTP] <-- POST /session 200 72625 ms - 525
```

- In our case it's 200, which is just an HTTP return code. It can be 404 if you can't find the root, or 500 if something went wrong.
- A useful piece for debugging purposes is the time that it took to operate on that command. In this case, it took about 73 seconds to start the session. It's relatively slow, but based on this number you can observe that things take longer or shorter than expected sometimes. This is essentially the arbiter of how long it took. To make things less arcane, you can have the logs print the timestamp at the beginning, and then go through and subtract things.
- The last number - 525 - is the content size of the response. It can be huge. If you send a screenshot, you essentially get a picture turned into text which is sent back on the wire.
 - ■ Looking at logs is a tedious but necessary task, in order to get a sense of what is happening in Appium and debug any problem on your own.

The mere knowledge of the steps that are happening makes clear why, in this case, it took 73 seconds to create a session - there's lots going on in there. Vest your effort into bringing orderly transparency to the seemingly disorderly chaos. Familiarize yourself with the tools on your tool belt. Try to minimize entropy, not maximize it!



Resources

Tracing the path of Appium command by Rajdeep Varma
https://youtu.be/_EkNLse0Fwo

Can you please provide the full Appium server logs? - Isaac Murchie
<https://youtu.be/mOkgAxIWdGg>

Anatomy of Logging in Appium
<https://appiumpro.com/editions/10-anatomy-of-logging-in-appium>

Appium Capabilities
<https://appium.io/docs/en/2.0/guides/caps/>

Appium Server Arguments/Flags
<https://appium.readthedocs.io/en/stable/en/writing-running-appium/server-args/>

Appium Default Capabilities
<https://appium.readthedocs.io/en/stable/en/writing-running-appium/default-capabilities-arg/#the-default-capabilities-flag>

W3C WebDriver Endpoints List
<https://www.w3.org/TR/webdriver1/#list-of-endpoints>

W3C WebDriver Endpoints - Appium Practice postman_collection.json
<https://qist.github.com/lana-20/b57d127782dafb645ecf577694de74d6>

Controlling Appium via raw HTTP requests with curl
<https://appiumpro.com/editions/110-controlling-appium-via-raw-http-requests-with-curl>

Demo AUT - The App
<https://github.com/cloudgrey-io/the-app/releases>

Xcode Release Notes
<https://developer.apple.com/documentation/xcode-release-notes/>

References

