OpenMRS

CVE-2017-12796

Context

Deserialization of XML input into objects

Problem

Exploitation of this vulnerability is possible through a single HTTP POST request to the page at http://localhost/openmrs/admin/reports/reportSchemaXml.form Accessing this page through a browser **without authenticating first** will redirect the user to the login page (so far so good). Under the hood, however, the application is actually executing server-side code before the HTTP redirect response is generated (not so good). Through a Java debugger, with a few strategically placed breakpoints, it becomes apparent that **a validation function is being called prior to any auth checks in the reportSchemaXml form controller**. By itself, this is a relatively low-severity issue. The end result is still a HTTP 302 to the login page. The real problem here is revealed by stepping into the call to reportService.getReportSchema(rsx). Within this function, a deserialization call can clearly be observed. Furthermore, this **deserialization call takes as input user-provided data from the original POST request**. Again, this is a pre-auth POST request; no **authentication checks have been run**. An additional step into the deserialize() function shows that XStream is being used for deserialization instead of builtin Java deserialization fuctions. At this point it has been established that the **application is deserializing arbitrary input from an unauthenticated user without any filtering**. For a full explanation of why this is so bad, and why this will almost certainly lead to some kind of **RCE** vulnerability, check out this article by FoxGlove Security. The next step in the exploitation process is to **craft a malicious Java object that, when passed to the XStream deserialize() function, will result in RCE**.

Solution

Validation of the XML input before deserialization. This avoids that a plug-in **injects OS commands**.

Codes

"Arbitrary code execution", "Perform security check on unsanitized data", "Code Injection"