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COMPUTER SCIENCE

Team GladiOS Notification Round 4

Testing NavUP Longsword Notification Module

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1 Functional Requirements

1.1 Core Functionality

1.1.1 Email

The core functionality of the notification module is to send email notifications to users. To test the core functionality we used the tests outlined in Table 1. The two use cases tested was sending a single email and sending a batch of emails.

Service Contracts:

- Email to single user. Score: 7.4
- Emails to all users. Score: 0

1.2 Innovations

1.2.1 SMS

The SMS interface has been declared but the functions are not implemented. This means that all the tests we ran failed due to their function returning a hard coded values. No SMS messages were received. The tests we used to test the SMS functionality is outlined in Table 2. The two use cases tested was sending a single SMS and sending a batch of SMS messages.

Service Contracts:

- SMS message to single user. Score: 0
- SMS messages to all users. Score: 0

1.2.2 Push Notifications

The Push Notification interface has been declared but the functions are not implemented. This means that all the test we ran failed due to their functions returning hard coded values. Though the interface cannot initialize a push notification the push notification sub-module is able to issue push notifications to user devices. This was verified by separate tests. The tests we ran on the interface is outlined in Table 3. The two use cases tested was sending a single push notification and sending a batch of push notifications.

Service Contracts:

- Push Notification to single user. Score: 0
- Push Notifications to all users. Score: 0

2 Non-Functional Requirements

Our tests for non-functional requirements can be found in Table 4.

2.1 Performance

The email tests concluded that the system is able to send 100 emails in 8.02 minutes. The system is therefore inefficient in its real time processing as it unable to send batch emails and starts a new SMTP session for every email sent rather than opening up one session for all emails that need to be sent, which is a poor utilization of resources. The system is effective however, as it is able to send an email but ineffective when sending SMS messages or push notifications due to their interfaces not being implemented.

We score their performance a 6.

2.2 Quality

The system is reliable in the sense that it is able to send 100 emails and all are delivered successfully. However it is unreliable in the sense that it is unable to send multiple emails in a timely manner as required. It also returns true when the SMS and push notifications are tested without them actually doing anything due to their interface functions not being implemnted. The system is almost always available as long as they have an internet connection and a valid email, we assume this because they use Google's Gmail SMTP service which has a 99.99% uptime.

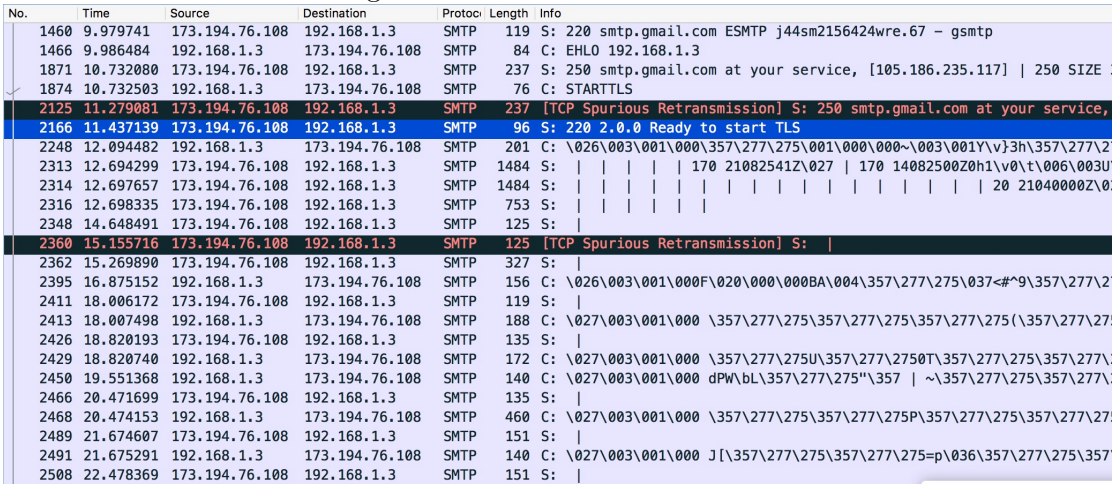
We score their quality a 6.

2.3 Security

Data security is a very important aspect in any system. There is no exception in this module, any data sent by the module should be secure and only the party who the email is intended for should be able to view the content of the email. This module uses Google's Gmail SMTP service. The Gmail SMTP service requires a TLS (Transport Layer Security) session. This is acomplished with TTLS(Tunneled Transport Layer Security). TTLS is an EAP (Extensible Authentication Protocol) method that encapsulates a TLS session, consisting of a handshake phase and a data phase. This ensures that the data being sent between the notification module and Gmail's SMTP server is encrypted. This can be verified using WireShark to sniff the SMTP and TTL packets. A screen-shot of the packet sniff is on Figure 1. The line in blue shows that Gmail acknowledged the start of the TLS. Everything after this line will be encrypted. We could not verify this for SMS messages and push notifications because thier interfaces were not implemnted.

We score their security a 10.

Figure 1: SMTP WireShark Trace



No.	Time	Source	Destination	Protoc	Length	Info
1460	9.979741	173.194.76.108	192.168.1.3	SMTP	119	S: 220 smtp.gmail.com ESMTP j44sm2156424wre.67 - gsmtp
1466	9.986484	192.168.1.3	173.194.76.108	SMTP	84	C: EHLO 192.168.1.3
1871	10.732080	173.194.76.108	192.168.1.3	SMTP	237	S: 250 smtp.gmail.com at your service, [105.186.235.117] | 250 SIZE
1874	10.732503	192.168.1.3	173.194.76.108	SMTP	76	C: STARTTLS
2125	11.279081	173.194.76.108	192.168.1.3	SMTP	237	[TCP Spurious Retransmission] S: 250 smtp.gmail.com at your service,
2166	11.437139	173.194.76.108	192.168.1.3	SMTP	96	S: 220 2.0.0 Ready to start TLS
2248	12.094482	192.168.1.3	173.194.76.108	SMTP	201	C: \026\003\001\000\357\277\275\001\000\000~\003\001Y\v}3h\357\277\2
2313	12.694299	173.194.76.108	192.168.1.3	SMTP	1484	S: | | | | | 170 21082541Z\027 | 170 14082500Z0h1\v0\t\006\003U
2314	12.697657	173.194.76.108	192.168.1.3	SMTP	1484	S: | | | | | | | | | | | | | | | | | | | | | 20 21040000Z\0
2316	12.698335	173.194.76.108	192.168.1.3	SMTP	753	S: | | | | | |
2348	14.648491	173.194.76.108	192.168.1.3	SMTP	125	S: |
2360	15.155716	173.194.76.108	192.168.1.3	SMTP	125	[TCP Spurious Retransmission] S: |
2362	15.269890	173.194.76.108	192.168.1.3	SMTP	327	S: |
2395	16.875152	192.168.1.3	173.194.76.108	SMTP	156	C: \026\003\001\000F\020\000\000BA\004\357\277\275\037<#^9\357\277\2
2411	18.006172	173.194.76.108	192.168.1.3	SMTP	119	S: |
2413	18.007498	192.168.1.3	173.194.76.108	SMTP	188	C: \027\003\001\000 \357\277\275\357\277\275\357\277\275(\357\277\27
2426	18.820193	173.194.76.108	192.168.1.3	SMTP	135	S: |
2429	18.820740	192.168.1.3	173.194.76.108	SMTP	172	C: \027\003\001\000 \357\277\275U\357\277\2750T\357\277\275\357\277\
2450	19.551368	192.168.1.3	173.194.76.108	SMTP	140	C: \027\003\001\000 dPW\bL\357\277\275"\357 | ~\357\277\275\357\277\
2466	20.471699	173.194.76.108	192.168.1.3	SMTP	135	S: |
2468	20.474153	192.168.1.3	173.194.76.108	SMTP	460	C: \027\003\001\000 \357\277\275\357\277\275P\357\277\275\357\277\27
2489	21.674607	173.194.76.108	192.168.1.3	SMTP	151	S: |
2491	21.675291	192.168.1.3	173.194.76.108	SMTP	140	C: \027\003\001\000 J[\357\277\275\357\277\275=p\036\357\277\275\357
2508	22.478369	173.194.76.108	192.168.1.3	SMTP	151	S: |

Table 1: My caption

Test Email to Single User

Test	Input	Expected Result	Actual Result	Comment	Score	Weight
Send single email to user.	Email: u15029779@ tuks.co.za Subject: Longsword Notification Message: Longsword notification test.	{'success':'true', 'Error':'None'}	{'success':'true', 'Error':'None'}		10	0.5
Send single email to user with a empty message.	Email: u15029779@ tuks.co.za Subject: Longsword Notification Message:	{'success':'false', 'Error':'some error'}	{'success':'true', 'Error':'none'}	The email is still sent and the function returns true.	0	0.2
Send single email to user with a invalid email address.	Email: u15029779 Subject: Longsword Notification Message: Longsword notification test.	{'success':'false', 'Error':'some error'}	{'success':'true', 'Error':'some error'}	Their function returns true when an error occurs, but does provide the error description and the email is not sent.	8	0.3
				Total		7.4

Test Emails To All

Test	Input	Expected Result	Actual Result	Comment	Score	Weight
Send email to all users.	Message: Testing Email to All	{'success':'true', 'Error':'None'}	Empty String	Their function is empty and returns empty string.	0	0.5
Send single email to user with a empty message.	Message:	{'success':'false', 'Error':'some error'}	Empty String	Their function is empty and returns empty string.	0	0.2
				Total		0

Table 2: Test SMS

Test SMS to Single User

Test	Input	Expected Result	Actual Result	Comment	Score	Weight
Send single SMS to user.	User: User List Message: SMS Test	true	true	Result is hard coded. Function is not implemented and SMS is never received.	0	0.5
Send single SMS to user with a empty message.	Users: User List Message:	false	true	Result is hard coded. Function is not implemented.	0	0.2
Send single SMS to user with a invalid user.	User: User List with invalid user. Message: SMS Test	false	true	Result is hard coded. Function is not implemented.	0	0.3
				Total		0

Test SMS To All

Test	Input	Expected Result	Actual Result	Comment	Score	Weight
Send SMS to all users.	Message: Testing SMS to all	true	true	Result is hard coded. Function is not implemented and SMS is never received.	0	0.5
Send SMS to all users with a empty message.	Message:	false	true	Result is hard coded. Function is not implemented.	0	0.2
				Total		0

Table 3: Test Push Notification

Test Push Notification to Single User

Test	Input	Expected Result	Actual Result	Comment	Score	Weight
Send single Push Notification to user.	User: User List Message: Push Test	true	true	Result is hard coded. Function is not implemented and Push Notification is never initiated from the interface.	0	0.5
Send single Push Notification to user with a empty message.	Users: User List Message:	false	true	Result is hard coded. Function is not implemented.	0	0.2
Send single Push Notification to user with a invalid user.	User: User List with invalid user. Message: Push Test	false	true	Result is hard coded. Function is not implemented.	0	0.3
				Total		0

Test Push Notification To All

Test	Input	Expected Result	Actual Result	Comment	Score	Weight
Send Push Notification to all users.	Message: Testing Push to all	true	true	Result is hard coded. Function is not implemented and Push Notification is never initiated from the interface.	0	0.5
Send Push Notification to all users with a empty message.	Message:	false	true	Result is hard coded. Function is not implemented.	0	0.2
				Total		0

Table 4: Non-Functonal Requirements Tests

Test Performance

Test	Input	Expected Result	Actual Result	Comment
Send 50 Emails	Email: u15029779@ tuks.co.za Subject: Longsword Notification Message: Longsword notification test.	{'success':'true', 'Error':'None'}	{'success':'true', 'Error':'None'}	All 50 emails are successfully sent. They were all sent in 4 minutes and 11 seconds
Send 100 Emails	Email: u15029779@ tuks.co.za Subject: Longsword Notification Message:Longsword notification test.	{'success':'true', 'Error':'none'}	{'success':'true', 'Error':'none'}	All 100 emails are successfully sent. They were all sent in 8 minutes and 2 seconds