


## Data Management System For Penetration Test Results At The Aceh Informatics And Coding Communication Agency

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Article Info	ABSTRACT
<b>Keywords:</b> Pentesting Penetration Testing Data Management System Diskominsa Aceh	The Aceh Communication, Informatics, and Cryptography Service (Diskominsa Aceh) has an important role in maintaining information security in the midst of increasing cyber threats. The service has implemented a penetration test system to detect vulnerabilities in provincial government-owned websites, allowing them to actively address potential security vulnerabilities. However, the main challenge in the Aceh Communication, Informatics, and Cryptography Service (Diskominsa Aceh) Diskominsa and creating chances for the younger generation to gain more useful information technology abilities.
This is an open access article under the <a href="#">CC BY-NC</a> license 	<b>Corresponding Author:</b> Ira Zulfa Universitas Gajah Putih Aceh Tengah, Aceh, Indonesia <a href="mailto:ira.zulfaa@gmail.com">ira.zulfaa@gmail.com</a>

### INTRODUCTION

Diskominsa Aceh, or the Aceh Communication, Informatics, and Coding Office, is responsible for the management, development, and safeguarding of communication, informatics, and coding systems in the Aceh region. Diskominsa Aceh has implemented a penetration testing system to assess and find vulnerabilities on the websites of various provincial government agencies, improving data security. This method allows Diskominsa Aceh to find possible security holes, simulate attacks, and assess current system responses. The test results determine corrective actions.(Gunawan & Sudarsono, 2022) Afterward, reports and suggestions are made about improvements. By taking these actions, Diskominsa Aceh is committed to protecting provincial government information by using proactive and responsive security strategies to deal with increasingly complex cyber threats.(Alotaibi & Ahmed, n.d.)

Data management was the main issue that Diskominsa Aceh faced when implementing the penetration test system. penetration test results that still use Microsoft Excel. Microsoft Excel is a powerful spreadsheet application that can be used to display data, process data, perform calculations, create diagrams, reports, and do anything related to data in the form of numbers.(Sri Hartati, 2020) The downsides of using Microsoft Excel as a data recording tool include the risk of human error, file security issues, and a lack of collaboration than expected. Diskominsa Aceh should consider switching to a more integrated and secure information management platform, such as a database or centralized information management system, to address these issues.(Ramdhani & Supena, 2022) To reduce the

risk of human error and improve the efficiency of data storage and access, automation processes are also needed to monitor and manage penetration test results.

Taking on student interns to develop Data management systems can help. They can help in the creation of an easy-to-use web interface for the process of inputting, storing, and updating penetration test results.(Fauzi, 2020) To improve data security and ease collaboration, the developed system can use a centralized database. Diskominsa Aceh will benefit from this collaboration with student interns, which will not only provide innovative technical solutions, but will also provide opportunities for the younger generation to acquire practical skills in information technology.(Wahono & Ali, 2021)

## METHODS

Pada titik ini, penulis mengumpulkan data untuk pembuatan sistem melalui beberapa metode: (Himawati & Fitriasih, 2024)

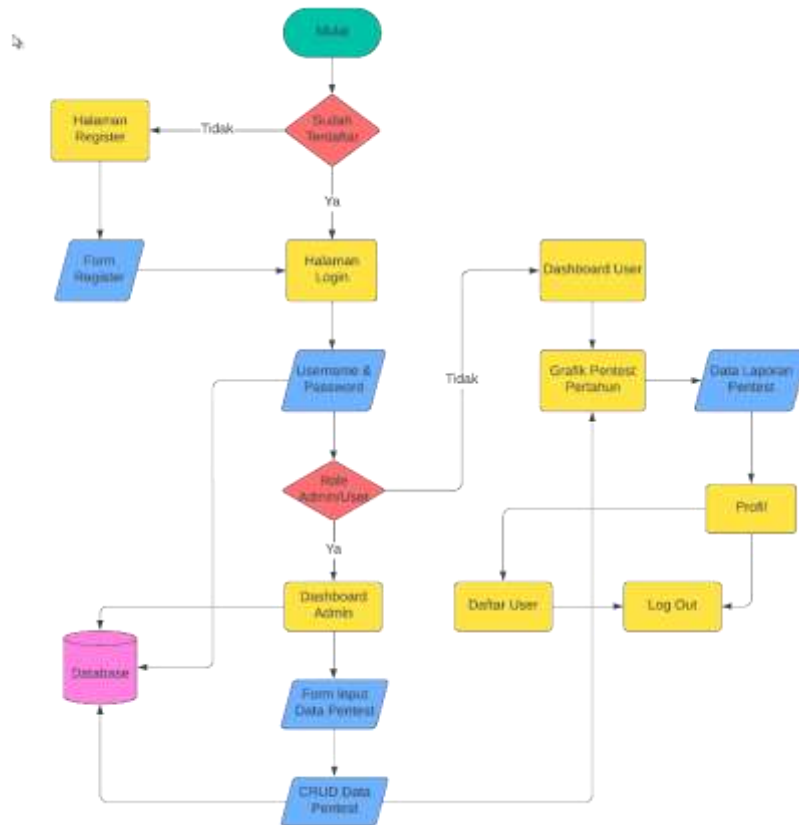
1. Observasi (Pengamatan): Penulis melakukan pengamatan langsung di Dinas Komunikasi, Informatika, dan Persandian Aceh untuk mendapatkan pemahaman tentang data yang berkaitan dengan pengujian penetrasi;
2. Wawancara: Untuk mendapatkan informasi tentang proses perancangan dan pengembangan proyek yang akan dilakukan, penulis mewawancarai Pembimbing Lapangan dan karyawan instansi secara langsung;
3. Studi Pustaka: Studi ini dilakukan dengan mengumpulkan dan mempelajari literatur tentang sistem manajemen data, tes penetrasi, dokumentasi CodeIgniter 4, dokumentasi Bootstrap, dan alat bantu perancangan sistem informasi.

## RESULTS AND DISCUSSION

1. System A system is a complete unit consisting of various factors that influence each other and are related or thought to be related ;
2. Data Management :The Data Management subsystem functions to manage data that will be used as information for decision making in the knowledge-based subsystem. The Model component consists of various models that help decision making. The main component of the system is knowledge-based, which manages the problem-solving process to reach the final solution. The user interface allows users to engage more with the system to get information;(Kristanti & Ain, 2021)
3. Deployment Assessment Deployment is a useful assurance assessment tool for business and operations. From an operational perspective, penetration assessment helps in the formation of information security strategies. through fast and accurate fault discovery. Penetration testing provides detailed information about security risks, which can be used if covered in the organization's security flows and procedures;(T et al., 2024)
4. CodeIgniter PHP Framework 4 CodeIgniter is a framework that uses the PHP programming language and can be used to create web-based applications that are easier to create. In 2006, Codeigniter was first released. Version 4-which is a development of the previous version-was released in 2020;(I Kadek Juni Arta & Nyoman Bagus Suweta Nugraha, 2020)

5. Bootstrap: Bootstrap is a tool that allows web page developers and designers to create faster interfaces.(3541-10471-2-PB.Pdf, n.d.) Bootstrap is a CSS framework library specifically designed for front-end website development and is also one of the HTML frameworks. CSS and javascript are the most common tools used by web developers when creating responsive websites;(Nestary, 2020)
6. PHP (Hypertext Preprocessor) is a server-based script language that has the ability to parse PHP code from web code with the Hypertext Preprocessor (PHP) extension, which produces a dynamic web display on the client browser side [8]. PHP is a multiplatform language that can run on Linux, Unix, Macintosh, Windows, and other information systems. It can also be run at runtime through the console and can also execute other system commands.(Muttaqien et al., 2022) PHP (Hypertext Preprocessor) is a script language that is often used to create dynamic website programs and is also often used to build content management systems (CMS). PHP is a server-side scripting language used for web development. It is called a server-side programming language because PHP is processed on the server computer, in contrast to client-side programming languages such as JavaScript which are processed by the client's web browser;(Junadi, n.d.)
7. MySQL: In this guide, you will learn to use MySQL to easily create, access, and manage data. MySQL is a highly flexible and secure open-source database management system. MySQL's speed, scalability, and security are very high. It is suitable for various applications, such as mobile applications and websites;(Hasibuan & Elhanafi, 2022)
8. Xampp : Xampp is a software collection that includes Apache, MySQL, PhpMyAdmin, PHP, Perl, Filezilla, and other components. Other. Installing PHP with Xampp, which includes PHP, Apache, MySQL, and Bahasa Indonesia, and PHPMyAdmin is usually required in a web development environment;(Sitorus & Simanjuntak, 2023)
9. Visual Studio Code: Visual Studio Code is a very easy-to-use program, but it has a powerful source code editor. With built-in support for JavaScript, script, and Node.js, as well as various extensions for other languages such as C++, C#, Python, and PHP, a good application is required to create program code;(Mentari et al., 2024)
10. Flowchart System: Flowchart is a method for writing algorithms using graphical notation. A flowchart is an image or chart that shows the sequence or steps of a program, as well as the relationship between processes and their statements. Symbols are used to describe this picture. Consequently, each symbol while connecting lines indicate the distance between processes. It will be easier to perform a section 4 check that is forgotten in the problem analysis by using a flowchart.(Dwivedi et al., 2023)

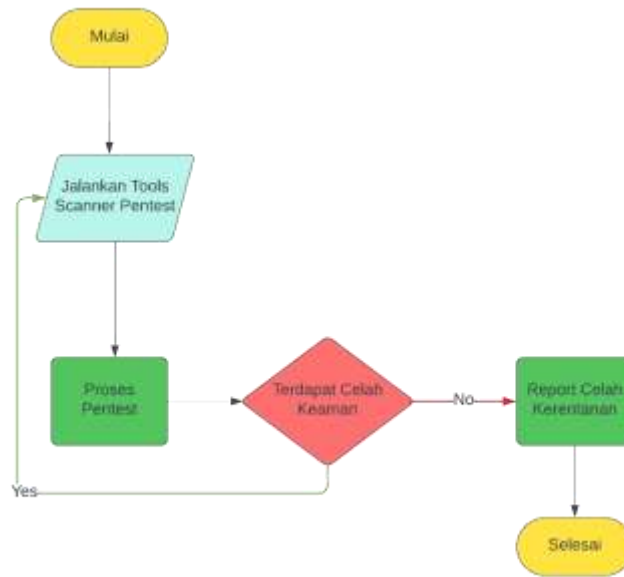
The purpose of making this flowchart is to get a clear understanding of the way a system operates. Below is a flowchart of the steps being performed:



**Figure 1.** Flowchart of the proposed system

To access the system, users must first login. If they do not already have an account, they must register through the registration process. If the user is an administrator, they will be taken to the administrator dashboard after logging in. On this page, various features are available, including pentest data input form, create, read, change, and delete (CRUD), profile, and user list. Due to the wider admin access, administrators can add, change, or delete data.

However, if users log in as users, they will be taken to the user dashboard, which can only view data. The pentest data report and annual pentest graph can be downloaded on this page. Users can exit the page after finishing accessing the information.



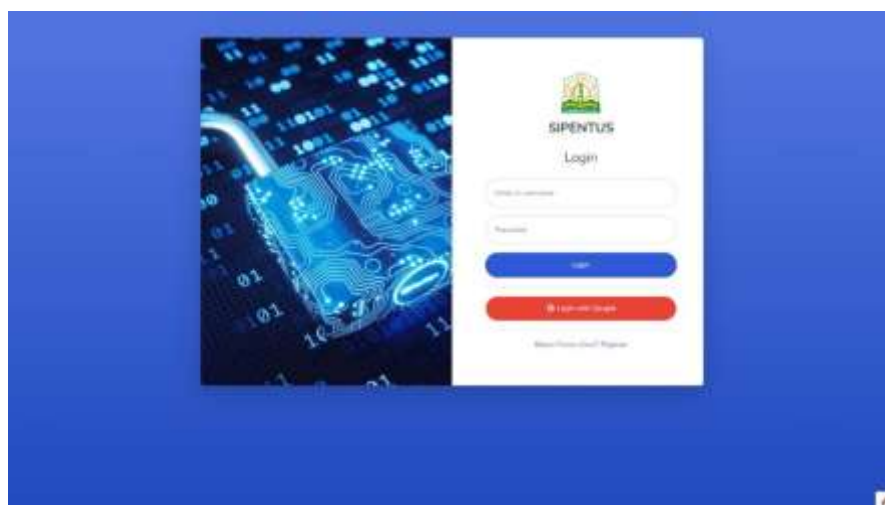
**Figure 2.** Flowchart of the running system

This is the flowchat of the Aceh Diskominsa system. as for its usefulness to see the results of the pentest to ascertain whether there are security gaps.

System Interface Implementation: The first step in enabling connection and interaction between the user and the system is to build the system interface. The system interface is the way the user interacts with the software or hardware. The implementation of the system interface includes many things, such as design, development, and testing. The system interface is physically and logically designed and displays various information for users according to system requirements and user access rights.(Larsen & Proserpio, 2024)

### Login Page

When users open the website, this login page is the initial page where they have to enter their username and password. Here is how the login page looks like.



**Figure 3.** Login page

## Registration Page

This page is used by new users who want to access the system and must complete the registration process first. The appearance of the registration page is as follows.

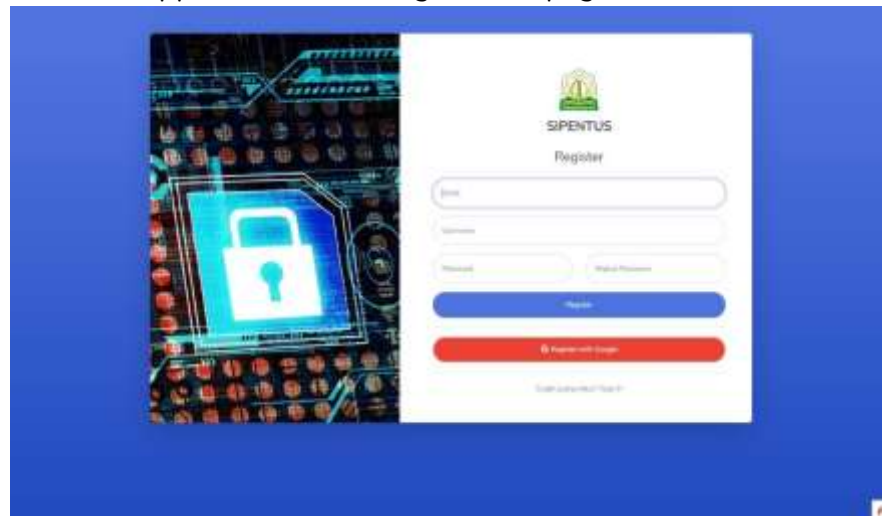


Figure 4. Register page

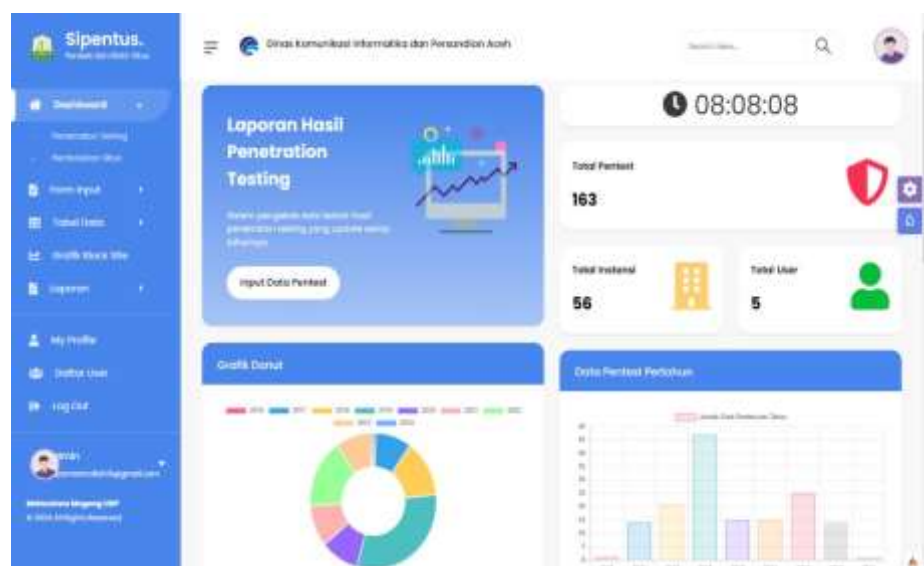


Figure 5. User Dashboard

## Admin Dashboard Page

After logging in as admin, this page is the admin dashboard page. On this page you can fill in forms, data tables, graphs, reports, profiles, and user lists, as well as the amount of data available in the system, time, and a feature to view data that allows you to directly access the penetration testing graph page.

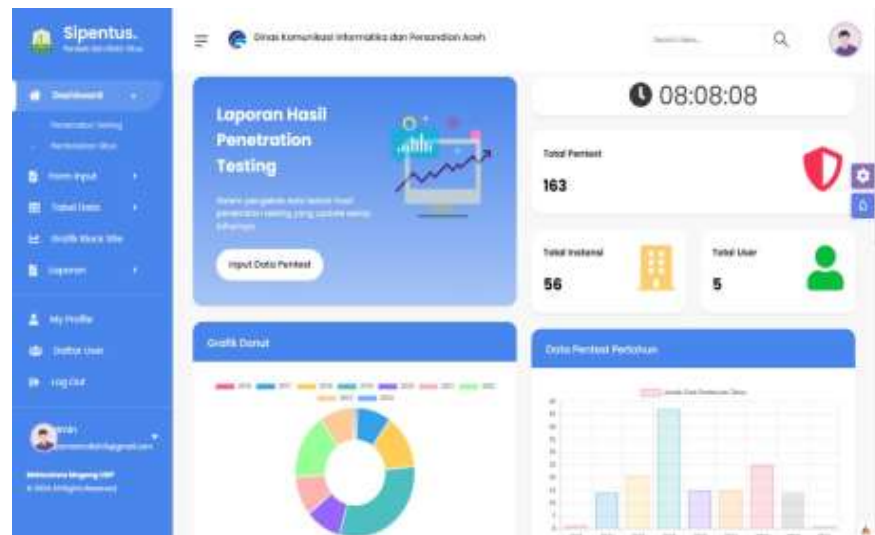


Figure 6. Admin Dashboard

This admin dashboard page also includes the most total system data, time, and penetration testing graphs. In addition, there is a data viewing feature that allows you to directly access the penetration testing graph page by year.

### Input Form Page

The input form menu is located on the sidebar and has submenus that include applicant ID, date, agency name, target URL, and person in charge.

Figure 7. Input Form Page

### Pentest Results Data Table page

Next, on the sidebar is the Data Table menu, which has a Pentest Results Table submenu. This submenu is part of the Create, Read, Update, and Delete functions, which can only be

controlled by the admin. On this page, various data has been added through the input form based on the pentest results that have been carried out.

ID User	Penerima	Tanggal	URL Target	Nama Instansi
01.018	Raydel	2019-01-08	http://localhost:8080/pentest.php	
01.017	Ikarna Gunandaru / Pengkaja Hosting	2019-01-07	http://101.100.101.101/~cpes	
01.016	Ikarna Gunandaru / Pengkaja Data Center	2019-01-15	http://101.100.101.101/~datacenter/aksharawebroot/	
01.018	Ikarna Gunandaru, ST / Pengkaja Data Center	2019-01-03	http://101.100.101.101/~etna	
01.018	T. Naja Helin	2019-01-07	http://101.100.101.101/~datahub/	
01.021	Hafidhamulrahman	2019-01-21	https://14-bitaku.10101.k	

Figure 8. Pentest Results Data Table

### Report Page

The report page, which can be accessed by users and administrators, has a feature to export documents in PDF format.

ID User	Penerima	Tanggal	URL Target	Nama
01.018	Raydel	2019-01-08	http://localhost:8080/pentest.php	Raydel
01.017	Ikarna Gunandaru / Pengkaja Hosting	2019-01-07	http://101.100.101.101/~cpes	
01.016	Ikarna Gunandaru / Pengkaja Data Center	2019-01-15	http://101.100.101.101/~datacenter/aksharawebroot/	
01.018	Ikarna Gunandaru, ST / Pengkaja Data Center	2019-01-03	http://101.100.101.101/~etna	
01.018	T. Naja Helin	2019-01-07	http://101.100.101.101/~datahub/	
01.021	Hafidhamulrahman	2019-01-21	https://14-bitaku.10101.k	

Figure 9. Pentest Results Report

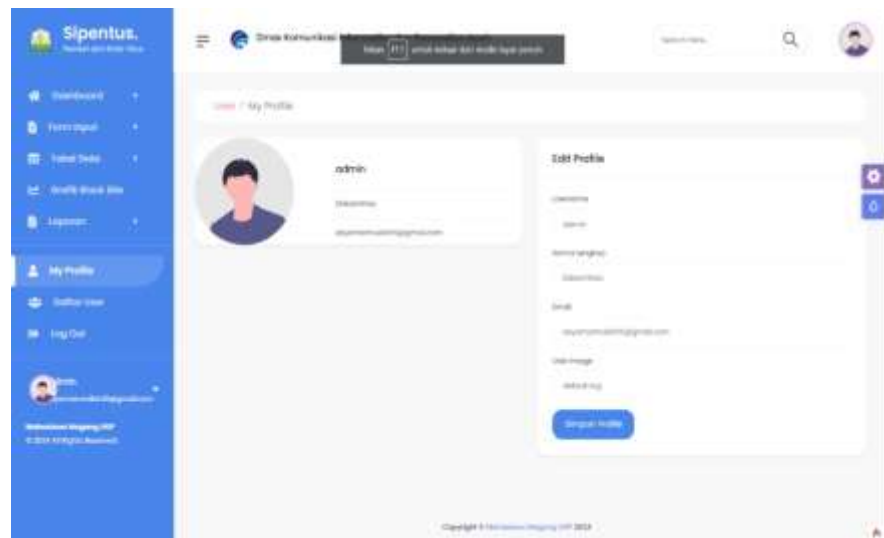
**Laporan Hasil Penetration Testing Tahun 2019**

No. User	Fungsi	Tanggal	URL Target	Nama Sistem	Perangkoan, Jenis			IP Address	Status Audit	Skor Penilaian			Keamanan
					Nama	Uraian	Kelemb			High	Medium	Low	
01.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-16	http://10.108.100.01/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.01	Temporary	0	0	0	OK		
02.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-16	http://10.108.100.02/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.02	Temporary	0	0	0	OK		
03.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-16	http://10.108.100.03/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.03	Permanent	0	0	0	OK		
04.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.04/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.04	Permanent	0	0	0	OK		
05.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.05/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.05	Permanent	0	0	0	OK		
06.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.06/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.06	Permanent	0	0	0	OK		
07.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.07/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.07	Permanent	0	0	0	OK		
08.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.08/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.08	Permanent	0	0	0	OK		
09.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.09/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.09	Permanent	0	0	0	OK		
10.2019	Revisi Sistem / Pengaktifan Data Center	2019-01-14	http://10.108.100.10/akademik/akademik.html	Website Dinas Pendidikan Aceh	Website	10.108.100.10	Permanent	0	0	0	OK		

**Figure 10.** Pentest report printout

**Profile Page**

The My Profile menu is located on the sidebar and takes users to a page where they can view and change their personal information.



**Figure 11.** Profile page

To change a profile, users simply need to click on the column they wish to change and add new information. After making all the desired changes, they can click the “Save Profile” button to save the changes.

**User List Page**

All system users are listed on the User List page menu, and the admin is the only one who can access it.



Figure 12. User List Page

Admins can view various user data and user details on this page, which is part of the user list. Information about each user, including their email address, can be viewed on this page.

## CONCLUSION

At the Aceh Communication, Informatics and Standardization Agency, the penetration test data management system has become an important asset for maintaining information security. The system plays an important role in storing, managing and analyzing penetration test data, providing a solid basis for finding vulnerabilities and stopping them. The system uses encryption techniques to ensure data integrity and confidentiality and supports effective cooperation between data security teams. As a result, the system greatly helps strengthen computer and network systems and protect information security at the Aceh Communications, Informatics and Signage Office.

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