User Authentication and Related Topics:
An Annotated Bibliography

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Introduction

This bibliography is the result of our examination of the current state of user authentication, with an emphasis on password authentication.

We believe that this bibliography is representative of the most important works in the area in recent years. Many of these citations include notes indicating the content of the work; however, inclusion of the citation or of additional notes does not necessarily indicate we believe the work to be more significant than other items.

We would appreciate being told of any pertinent references missing from this collection.

Acknowledgments

Our thanks to Matt Bishop for his suggestions of additions to this document.

References

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[4] Guidelines on user authentication techniques for computer network access control. Federal Information Processing Standards Publication 83, National Bureau of Standards, Washington, D.C., September 1980.

[5] Password usage standard. Federal Information Processing Standards Publication 112, National Bureau of Standards, May 1985.

[6] Niv Ahituv, Yeheskel Lapid, and Seev Nuemann. Verifying the authentication of an information system user. *Computers and Security*, 6(2):152–157, April 1987. The authors discuss the benefits and problems of different methods of user authentication. A quantitative measure of password strength and 'lasting' power is developed. Five password encryption techniques are discussed and compared using several criteria. Finally, ten authentication guidelines are presented.

[7] Ana Maria De Alvaré. How crackers crack passwords, or what passwords to avoid. Technical Report UCID–21515, Lawrence Livermore National Laboratory, September 1988. The author evaluates several password selection techniques that have been proposed in light of information she collected during interviews with password crackers. A list of recommended techniques for password selection is provided. Passwords and methods crackers have used to break into systems as well as security guidelines for system managers are also discussed.

[8] Ana Maria De Alvaré and E. Eugene Schultz, Jr. A framework for password selection. Technical Report UCRL-99382, Lawrence Livermore National Laboratory, 1988. This paper describes a study on the guessability of passwords. Both easy and difficult passwords were guessed at by subjects, some of which were given cues as to the makeup of the password. The results suggest that only easy passwords with known characteristics are readily guessable. The author concludes that users may select their own passwords securely if they follow guidelines that will make them difficult to guess.

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[14] Ben F. Barton and Marthalee S. Barton. User-friendly password methods for computer mediated information systems. *Computers and Security*, 3:186–195, 1984. This article discusses the need for better password methods given the increase in unauthorized system access and the growing numbers of novice users with access to networked workstations. The authors favor a user-friendly model of password selection over the user-hostile trend that sacrifices memorability for security.
A cognitive model for password selection is proposed based on semantic memory, episodic memory, and information from the environment. Various transformation and mnemonic techniques are also discussed. Finally, the authors assert that materials which would aid users in making good password choices should be readily available on the system.

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[21] Matt Bishop. An application of a fast Data Encryption Standard implementation. *Computing Systems*, 1(3):221–254, 1988. The author describes several improvements to the implementation of the DES algorithm that reduce the required computing time by more than an order of magnitude.

[22] Matt Bishop. UNIX security in a supercomputing environment. In *Supercomputing '89 Proceedings*, pages 693–698, November 1989. This paper describes user authentication in a supercomputing center which uses UNIX systems.

[23] Matt Bishop. Collaboration using roles. *Software – Practice and Experience*, 20(5):485–495, May 1990. The author discusses how to share an account without using shared passwords. The scheme developed uses the notion of a 'group account' controlled by an access file, and bases permissions on user identity as proved by a password.

[24] Matt Bishop. An extendible password checker. In *UNIX Security Workshop II*, pages 15–16. The USENIX Association, August 1990. The author describes the implementation of a proactive password checker, designed to test for poor password choices as the user attempts to select a password. The language used to specify tests is discussed, along with several examples.

[25] Matt Bishop. Password checking techniques. In *Proceedings of the Second Workshop on Computer Security Incident Response*, pages IV–D–1:4, June 1990. The author discusses password cracking and countermeasures in a UNIX environment.

[26] Matt Bishop. Authenticating network news. In *Proceedings of the 1991 Winter USENIX Conference*, pages 281–287, January 1991. This paper describes enhancements to USENET news allowing the originator of articles to be authenticated and the integrity to be checked.

[27] Matt Bishop. Metrics for comparing authentication systems. In *Proceedings of the Third Workshop on Computer Incident Handling*, pages G–11–1:10, August 1991. The author discusses how to compare authentication schemes.

[28] Matt Bishop. Password management. In *COMPCON 1991 Proceedings*, pages 167–169, February 1991. The author discusses general issues involved in password management.

[29] Matt Bishop. A proactive password checker. In *Proceedings of the Seventh International Conference on Information Security*, pages 150–158, May 1991. The author discusses a technique for limiting the user's ability to pick a bad password. A UNIX implementation is described.

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[42] Stephen F. Carlton, John W. Taylor, and John L. Wyszynski. Alternate authentication mechanisms. In *11th National Computer Security Conference Proceedings*, pages 333–338. National Bureau of Standards/National Computer Security Center, October 1988. This paper discusses three classes of authentication mechanisms: things you know, things you have, and things you are. Each mechanism is described, including examples of the mechanism in use; and the strengths and weaknesses of each are analyzed.

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[48] Michael Comer, (ed.). Underground advice. *Computer Fraud & Security Bulletin*, 4(2):8–11, December 1981. This article contains several pages of technical advice, written by a hacker, detailing how to break into computer systems.

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and recommends the distribution of password policies for all users. Finally, the author suggests checking password security with a password-cracking program.

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[94] Israel Herschberg. The hackers' comfort. *Computers and Security*, 6(2):133–138, April 1987. The author discusses the lack of security present in computing environments. According to the author, users overwhelmingly choose poor, unimaginative passwords when allowed to select their own. Users will also avoid requirements about password choice whenever possible. The lack of security of computer generated random passwords is discussed. The author recommends that passwords be screened through the use of dictionaries of poor passwords. Finally, the author criticizes the computing industry for equating user friendliness with the removal of obstacles to system use, and for the habit of adding security measures as an afterthought.

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