Tejas Ghalsasi research idea number 2

**Studying performance of Hadoop security using OpenSSL**

**Abstract**: Hadoop security has been a matter of interest because of the low focus on the subject. As HDFS runs on top of uniux, it relies on Unix for authentication. When a user logs in, the system queries “*whoami*” on the underlying unix and authenticates the user. In HDFS any user can connect directly to a datanode by bypassing namenode and can perform *“read”* and “*store*” operations. Due to the above mentioned flaw the users enterprises and businesses are vulnerable to

1. Impersonation Attack
2. Node or Cluster bypass attack
3. Evesdropping/passive attack

In this approach we intend to use OpenSSL libraries to study its impact on enhancing the security of Hadoop. OpenSSL is a robust, commercial-grade, and full-featured toolkit for the Transport Layer Security (TLS) and Secure Sockets Layer (SSL) protocols. It is also a general-purpose cryptography library. As per OpenSSL website , it can be used for the following applications:

* Creation of key parameters
* Creation of X.509 certificates, CSRs and CRLs
* Calculation of message digests
* Encryption and decryption
* SSL/TLS client and server tests
* Handling of S/MIME signed or encrypted mail
* ETC

References:

1. <https://rietta.com/blog/2012/01/27/openssl-generating-rsa-key-from-command/>
2. <https://github.com/openssl/openssl>
3. <https://www.openssl.org/>
4. Rahul, P. K. GireeshKumar T. 2015. A Novel Authentication Framework for Hadoop, International conference on Intelligence and Evolutionary Algorithms in Engineering Systems (ICAEES 201), Vol 324, 2015, pp 333--340.
5. Sadasivam G.S., Kumari, K.. A., and Rubika S. A Novel Authentication Service for Hadoop in Cloud Environment, IEEE International Conference on Cloud Computing in Emerging Markets (CCEM), pp 1--6, oct 2012, India
6. Nivethitha, S., Gangaa A., and Shankar, S. Authentication Service in Hadoop Using one Time Pad, Indian Journal of Science & Technology, vol 7, pp 56--62, Apr 2014.
7. Devaraj, D., Owen, O., 'Malley., Sanjay, R., Kan., Z., and, Adding security to Apache Hadoop, Horton works Technical report1, <http://hortonworks.com/wp-content/uploads/2011/10/security-design_withCover-1.pdf>.
8. Nivethitha, S., Gangaa A., and Shankar, S. Authentication Service in Hadoop Using one Time Pad, Indian Journal of Science & Technology, vol 7, pp 56--62, Apr 2014
9. Yoon, S., Jeong, Y., T., K.. A token-based authentication security scheme for Hadoop distributed file system using elliptic curve cryptography, springer journal of Journal of Computer Virology and Hacking Techniques
10. Ibrahim Lahmer , Ning Zhang, MapReduce: MR Model Abstraction for Future Security Study, Proceedings of the 7th International Conference on Security of Information and Networks, September 09-11, 2014, Glasgow, Scotland, UK [doi>10.1145/2659651.2659722]
11. Bhushan, L. Open Source Authentication in Hadoop, Springer journal of Practical Hadoop Security, 2014, pp 51—74
12. Mrudula Sarvabhatla, M. Chandra Mouli Reddy, and Chandra Sekhar Vorugunti. 2015. A Robust and Light Weight Authentication Framework for Hadoop File System in Cloud Computing Environment. In *Proceedings of the Third International Symposium on Women in Computing and Informatics* (WCI '15), Indu Nair (Ed.). ACM, New York, NY, USA, 463-468. DOI: http://dx.doi.org/10.1145/2791405.2791410