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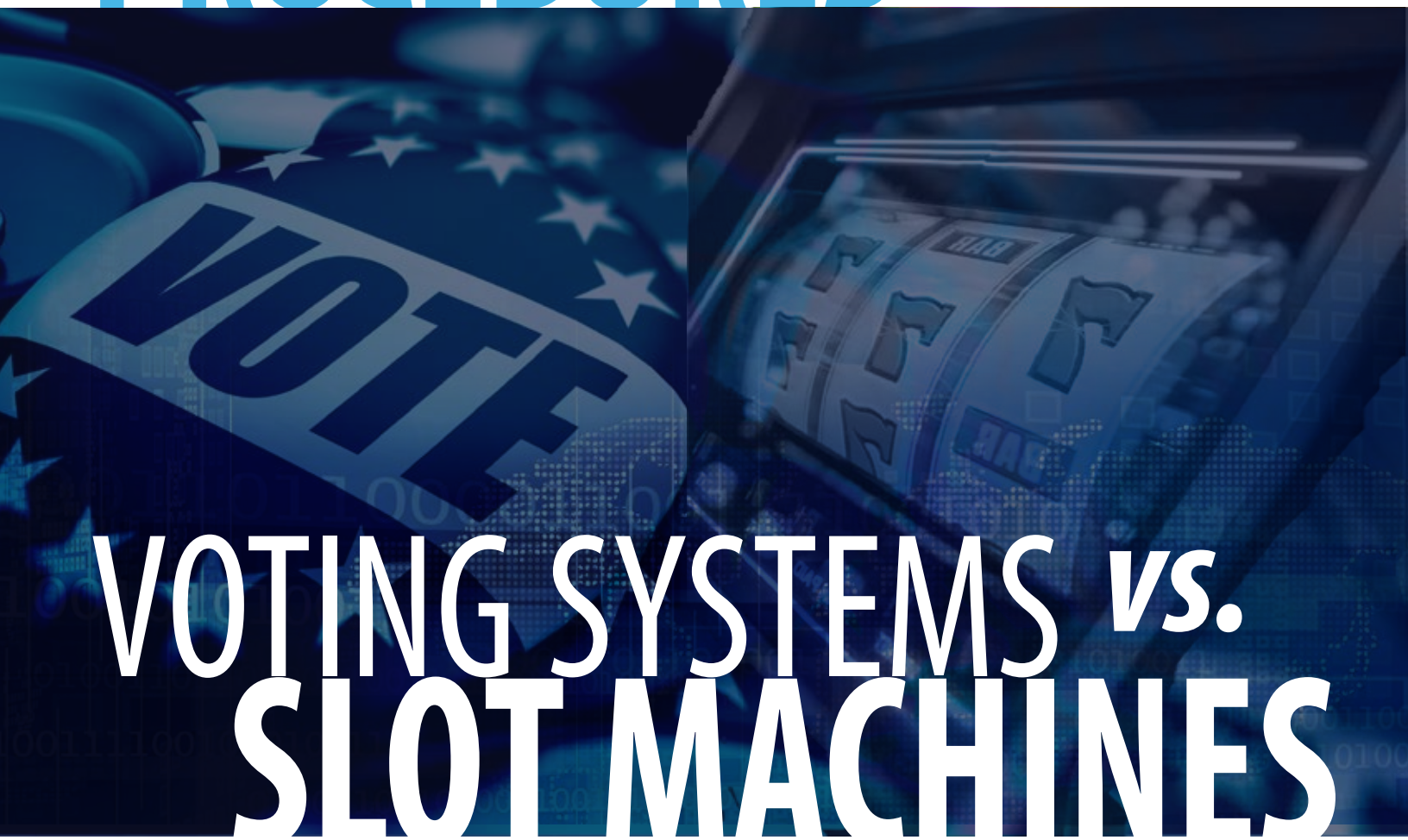
VERIFICATION PROCEDURES



VOTING SYSTEMS *vs.* SLOT MACHINES

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One of the central aspects of voting system security relates to software installation and verification procedures. Specifically, verification of software before and after installation on voting equipment is essential to ensure equipment is running software equivalent to what was certified. SLI Compliance has a unique perspective from its parent company, Gaming Laboratories International (GLI), which performs third-party testing and certification for hundreds of jurisdictions in the global gaming industry.

This perspective provides insight into the similarities of software verification techniques mandated by the Voluntary Voting System Guidelines (VVSG) and software verification in the gaming industry.

- SLI is a Voting System Test Lab (VSTL) accredited by the Election Assistance Commission (EAC) to perform certification testing on voting systems.
- SLI is a division of Gaming Laboratories International (GLI), LLC which performs third-party testing and certification for hundreds of jurisdictions in the global gaming industry.

Although there are clear differences between gaming and voting equipment...

...the similarities they share with respect to secure software installation and verification processes are significant. A typical scenario in either case is that a large number of devices need to have certified software installed and maintained during their operational lifetime, all with the highest level of security and confidence possible that the software is equivalent to what was certified, and that no other unintended software is resident in the critical memory space of the equipment. The VVSG requirements lay out two techniques of verifying installed content, which is essentially before or after the software is installed on a machine. Gaming requirements for installation verification vary by jurisdiction but generally follow similar pre- and post-installation verification techniques prescribed in the VVSG.

Under the auspices of the U.S. Election Assistance Commission's certification program, voting software is built, verified, and tested during a certification test campaign by the Voting System Test Laboratory (VSTL).

- During a certification test campaign by the VSTL, a file list is created and corresponding hashes are generated for each component of the electronic voting system.
- Once the voting system is certified, the hash list is shared by the EAC upon request.

These hashes play a key role in security for election officials during software install, upgrade and audit verification.

Similar to standard VSTL processes...

...gaming software that is being tested and certified is built and hashed at the test lab. Critical file hashes, certification status, and other software metadata are stored in a database designed and maintained by the test lab. This database is accessible through a web portal to those with appropriate credentials, which include regulators, casino operators, and gaming software suppliers. Certification information is available in real time and can be used by officials in the field to directly validate certification documentation as well as hash results for both pre- and post-installation procedures relatively efficiently.

Voting and Gaming Similarities, with respect to secure software installation and verification processes, include:

- A large number of devices are required to have certified software verified, installed, and maintained during their lifetime.
- A high level of security is required.
- No unintended software may be resident on the equipment.
- The utmost confidence that the software is equivalent to what is certified must be upheld.

How can you guarantee what was certified is what is installed?

Verification of software before and after installation is essential to ensure equipment is running software equivalent to what was certified for both voting systems and slot machines.

For Voting, the VVSG requirements lay out two techniques of verifying installed content, before or after the software is installed on a machine.

For Gaming, the requirements for installation verification vary by jurisdiction but generally follow similar pre- and post-installation verification requirements.

Gaming software is also built and hashed at the test lab similar to Voting although unlike Voting, the certification test lab maintains a database, accessible by those with appropriate credentials, that stores the following:

- File Hashes
- Certification status
- Other software metadata

Certification information is available in real time and can be used by officials in the field to directly validate hash results for installed softare using both pre- and post-installation procedures.

Expanding on the concept of hashes accessible through a databases web portal...

...technology exist to automate portions of this process. The Gaming Standards Association (GSA) is an international association that defines, develops, and implements technological innovations for the gaming industry. One of the technologies in use is a standardized protocol that provides a mechanism allowing regulators and operators to verify that only approved software is running in gaming machines. Through a computer application and physical interface on the machine, the protocol can:

- Determine what certified software is installed.
- Produce hashes for the installed software using standard algorithms.
- Compare the result to a trusted source of hash information for the certified software in real time.

The result is a secure and standardized approach to verifying certified software, post-installation, using a third-party application that is not bound to any specific supplier's technology. Certified software can be verified immediately following installation and thereafter, as often as needed or is practicable.

Election officials and gaming operators both rely on certified hash lists to verify that software in the field is valid, to maintain data integrity, and ensure malicious or altered software is not resident on the equipment. We have shown that methods and technology already exist in other industries that, in theory, could be employed for use on voting equipment with the primary goal of easing the burden and complexities of verifying a large amount of equipment in an expedient manner.

These methods have the potential to introduce additional levels of security to the processes already in place, all within compliance to the standards set forth by the VVSG.

About SLI Compliance®:

SLI Compliance® has more than 15 years of independent testing and certification experience with voting systems and election process. The company is an accredited Voting System Test Laboratory (VSTL) under the auspices of the National Voluntary Laboratory Accreditation Program (NVLAP TESTING Lab Code 200733-0) administered by the National Institute of Standards and Technology (NIST), in partnership with the United States Election Assistance Commission (EAC).

CONTACT SLI COMPLIANCE® TODAY

Helping to ensure elections are reliable, accurate, secure and transparent. That's SLI.

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