# KSI® blockchain in Estonia

The Estonian Government started testing blockchain technology in 2008, as a response to 2007 cyber attacks and with an aim to mitigate possible insider threats.

Estonia was the first nation state in the world to deploy blockchain technology in production systems – in 2012 with the Succession Registry kept by the Ministry of Justice.

## Which Estonian state agencies are utilising blockchain technology today?

→ Ministry of Economic Affairs and Communications
→ Ministry of Justice
→ Ministry of Finance
→ Ministry of the Interior
→ Ministry of Social Affairs

Selected State Registries backed by the Blockchain technology:
→ Healthcare Registry
→ Property Registry
→ Business Registry
→ Succession Registry
→ Digital Court System
→ Surveillance / Tracking Information System
→ State Gazette (official laws and regulations)
→ Official State Announcements

## For what purpose is Estonia using the blockchain technology?

Estonia uses blockchain technology to enforce the integrity of government data and systems.

## Why is it important to enforce the integrity of government data?

→ The ability to **100% trust government data** in any situation is one of the foundational capabilities for any Nation State.

→ The ability to enforce integrity of government data provides the capability to effectively **mitigate insider threat** focused at manipulating with and abusing the stored data.

→ The ability to verify the integrity of government data independently of its home database, in real time, enables **data interoperability** between systems and across boundaries.

**More information:** e-estonia.com | guardtime.com

## How is blockchain deployed in Estonian state information systems?

Estonian Information Systems Authority (RIA) is an internal Service Provider for the Government guaranteeing the access to the blockchain network for the State Agencies via the X-Road infrastructure.

State Agencies deploy the blockchain technology by themselves using the SDK-s and prebuilt tools (i.e. for log and database integration).

## Estonian criteria for selecting blockchain technology?

→ **Formal security proof.** The selected blockchain must have a formal security proof demonstrating its security properties mathematically.

  → **Immutable trust anchor.** The selected blockchain should have as strong trust anchor as possible.

→ **100% privacy.** The selected blockchain must enable storing data off the blockchain for guaranteeing 100% record privacy.

→ **Scalability.** The selected blockchain must scale to millions of operations per second.

→ **SLA-backed.** The selected blockchain must not depend on public self-managing systems with ambiguous governance.

## Which blockchain technology is being used by the Estonian state?

KSI® blockchain technology stack by Guardtime.

## Who else uses Guardtime's KSI blockchain technology today?

→ NATO
→ U.S. Department of Defense
→ Lockheed Martin
→ Boeng
→ Ericsson
→ Telstra
→ SAP
→ GE

## The roadmap for KSI blockchain and Estonia

→ **Data embassies** (with RIA)
→ **Smart Grid** (with Elering and Estonian Energy)
→ **Personalised medicine** (with Estonian Genome Center)
→ **Cyber-defence** (with Estonian Ministry of Defence / NATO CCDCOE)
→ **Electronic Taxation** (with Estonian Ministry of Finance

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→ Estonian Government has:

- 15 years of experience in testing the blockchain technology
- 11 years of experience in deploying the blockchain technology in production systems

→ Blockchain technology is used for enforcing the integrity of government systems and data

→ Ongoing work on R&D for future use cases for blockchain beyond data integrity

→ The technology chosen for Estonian systems is Guardtime's KSI® blockchain stack