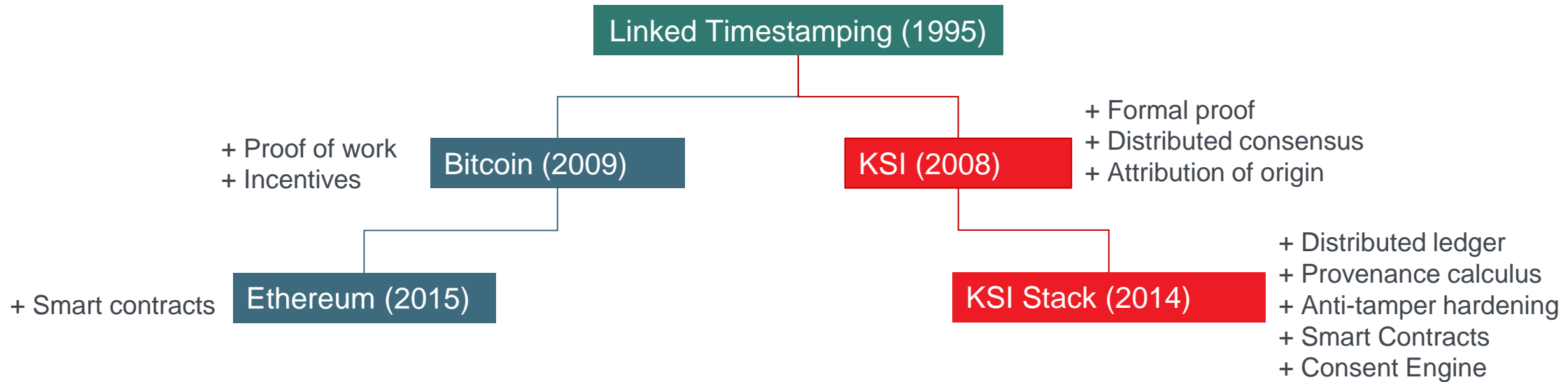


WGISS-52 Executive summary – Blockchain KSI Technology

- KSI Blockchain technology enables functionality, that provides **integrity, time and provenance** of any digital assets. In space sector, focus is on satellite mission data (archiving and dissemination)
- KSI Blockchain is **globally accessible permissioned blockchain** using widely witnessed events as proof to make the data already on blockchain impossible to change. It is in production since 2010 (Defense, Gov)
- It is built to **digest data at massive scale** and light interaction with legacy systems (push-pull requests and receive tokens, billions of requests in second)
- Technology demonstration is provided on the **ESA Space data preservation archive**. Input EO-SIPs are signed and verified to provide long term validation.

[More info: https://guardtime.com/eoguard](https://guardtime.com/eoguard)

TECHNOLOGY FAMILY TREE



The cryptography behind the individual components of Bitcoin has been well known since the 1990s and Guardtime's cryptographers have been very active participants in that history.

Buldas and Saarepera from Guardtime were the first cryptographers to give a formal security proof in 2003 of what properties do you need for hash-functions and data structures in order to build a formally verifiable security proof for hash-tree based time-stamping.

See more: guardtime.com/technology

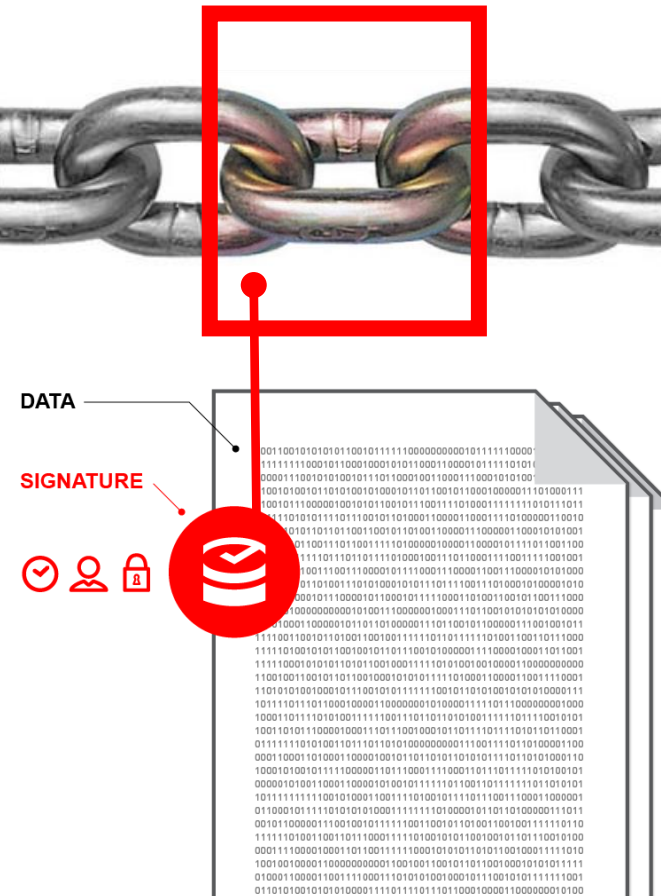
KSI[®] Blockchain Service

KSI Blockchain provides a tagging system for electronic data: KSI Signature.

These signatures prove the integrity, time and provenance (human or machine) of the data without relying on trusted third parties, public/private keys or credentials that can be compromised or hacked.

Highlights

- Designed for data ingest at massive scale
- Guaranteed signature response in next second
- Proven track record, 24/7 uptime since 2010
- KSI Signature allows independent verification of data properties by third parties



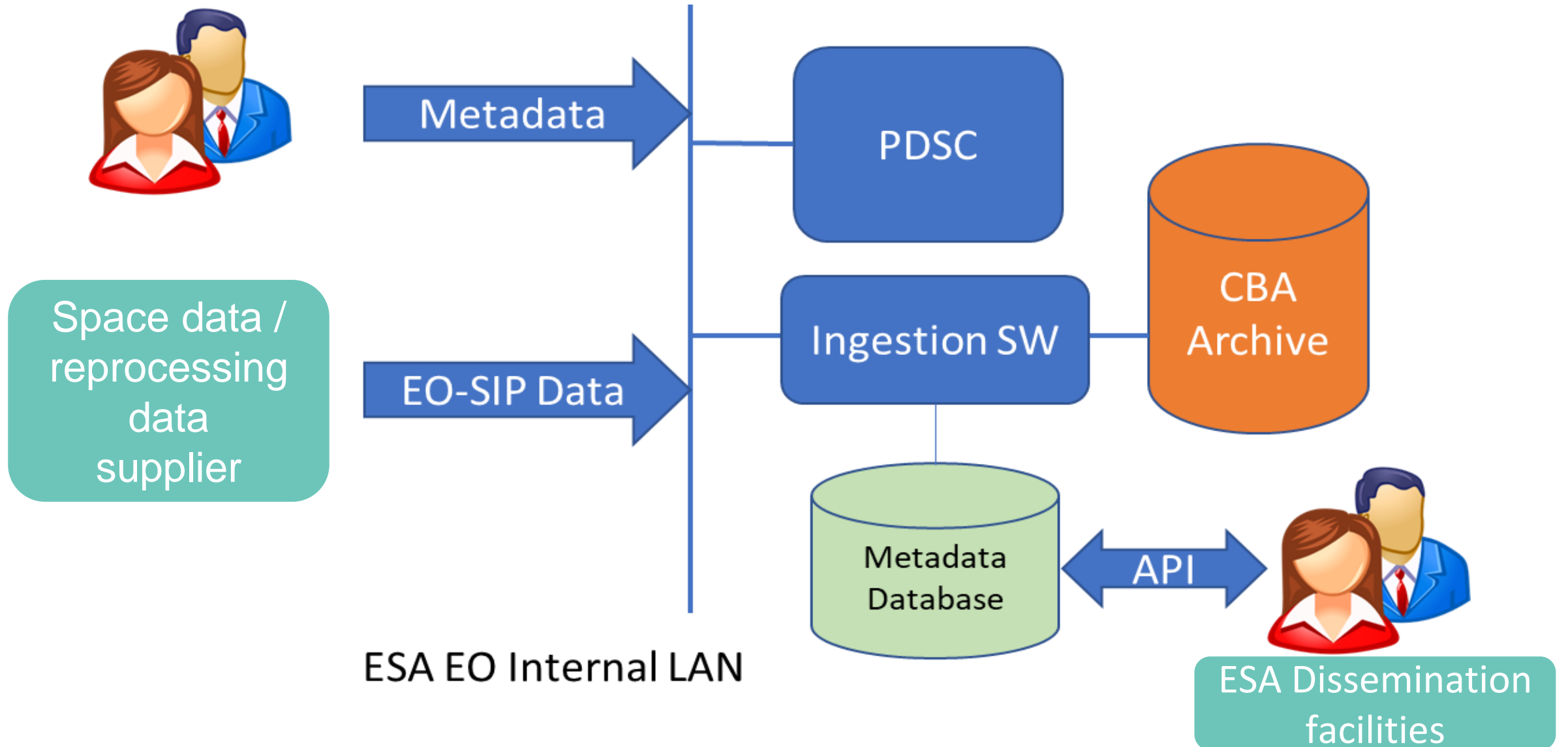
Technology differentiators

Scalability	KSI Blockchain is infinitely scalable. Specifically no matter how many transactions are executed on the platform the blockchain grows with constant size (~3GB per year).
Security	KSI Blockchain has been under constant attack since 2010 with zero down time. There is no single point of failure and the IP addresses of the consensus nodes are private ensuring attack tolerance to denial of service attacks. There is a formal mathematical security proof for the system.
Privacy	No user data is stored in the blockchain and no information about client usage is stored either (any blockchain that stores data cannot scale).
Legacy	KSI works seamlessly with existing ERP systems. No rip and replace and no need to update data into a new system.
Performance	Settlement is guaranteed to happen within one second and verification happens locally, offline in milliseconds.

Blockchain's comparison

	KSI blockchain	Bitcoin	Ripple	Hyperledger	NXT	Ethereum
Trust model	Widely witnessed evidence	Proof of work	Custom distributed trusted consensus algorithm	Practical Byzantine Fault Tolerance by trusted nodes	Proof of stake	Proof of work – transition to PoS on roadmap
Currency	No native currency	BTC – mined, inflationary	XRP – premined, fixed supply	No native currency	NXT – premined, fixed supply	Ether – premined, fixed supply
Settlement speed	~1 second	10 minutes, up to an hour for high confidence.	~ 1 minutes	~ 4 seconds	~ 1 minute	12 seconds
Ledger	Permissioned, distributed hierarchically, non-financial	Permissionless, distributed via P2P	Permissioned, distributed via P2P	Permissioned, distributed via P2P	Permissionless, distributed via P2P	Permissionless, distributed via P2P
Scale	Billions of commits per second	~7 transactions per second globally	100's of transactions per second	1000's of transactions per second	1000's of transactions per second	10-100 tx per second on reasonable HW
Blockchain growth	Linear in time, 3Gb per year	Linear in transactions, 36Gb and growing	Linear in transactions, ~9Gb but not required by client	Private ledgers which depend on volume of use. No real blockchain.	Linear in transactions, ~400 Mb	Linear in transactions, likely to be large...

Demonstration setup - ESA Space Data Preservation Archive



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Thank you!

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