Solution Brief

Thales Luna HSM for 5G Performance Measurements

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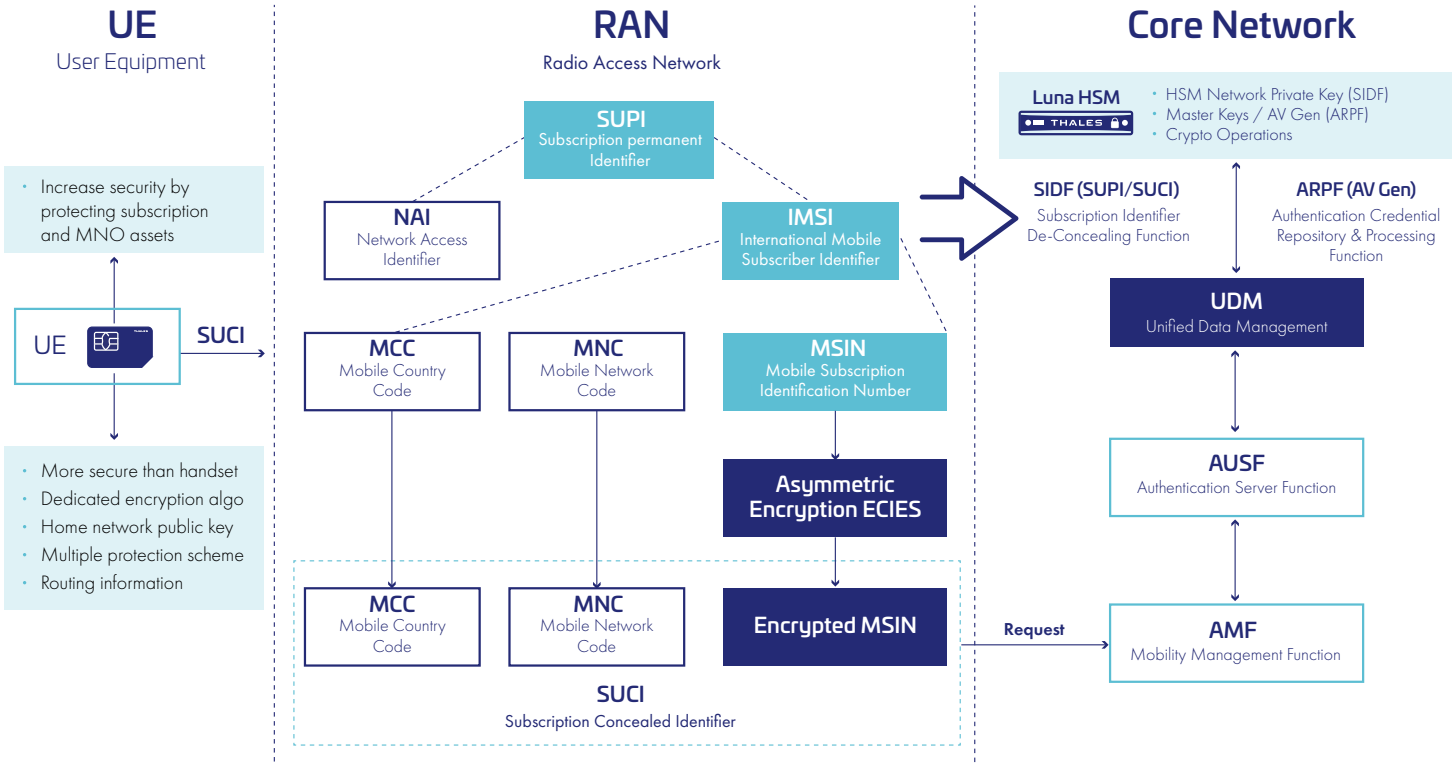
Thales 5G Luna Hardware Security Modules (HSMs) specifically address the throughput needs required by Network Equipment Providers (NEPs) and Mobile Network Operators (MNOs) for 5G.

Thales has optimized its **Luna Network HSMs** to meet the performance, flexibility, scalability, and high availability needed for 5G security:

- Meet the demanding high throughput and efficiency requirements for 5G
- Easily scale to satisfy service level agreements (support clustering with up to 32 members)
- Reduced total cost of ownership:
  - Up to 1,700 ECIES Profile A Decrypt 25519 tps, and up to 7,000 tps for Profile B Decrypt P-256
  - Up to 6.200 TPS Milenage or Comp Tuak Auth Vector Gen
  - Less hardware means less to set up, update and manage
- Low latency with fast response times
- Meet performance needs while maintaining a high assurance security posture



SUCI Decryption Performance Measurements

Number of HSM in HA group	1	2	8
ECIES P-256 Decrypt (decompressed keys)	7,000 TPS	14,000 TPS	56,000 TPS
ECIES P-256 Decrypt (compressed keys)	2,000 TPS	4,000 TPS	16,000 TPS
ECIES 25519 Decrypt	1,700 TPS	3,400 TPS	13,600 TPS

Subscriber Authentication Vector Generation Performance

Number of HSM in HA group	1	2	8	Parameters format
Milenage **(performance varies depending on the parameters format)**	4,200 TPS 6,200 TPS	8,400 TPS 12,400 TPS	33,600 TPS 49,600 TPS	eOPc and RC values OP handle and a RC value
Comp Tuak **(performance varies depending on the parameters format)**	4,300 TPS 6,300 TPS	8,600 TPS 12,400 TPS	34,400 TPS 50,400 TPS	eOP value OP handle

Test system configuration

- Test System
  - Mem: 16GB, Processor: Intel® Xeon(R) CPU E5-2640 v4 @ 2.40GHz × 40 (40 cores), 64 bit CentOS8
  - Luna network HSM A790 – local network with very low latency
- Multi threads and high availability for optimal performance
  - Maximum performance is obtained using multi threads and by configuring high availability clusters

Performance depends on the paramater format: The authentication generation function supports different parameter formats and encryption modes that may affect the performance. We indicate both the lowest performance configuration and the highest performance configuration.

Ki / OP key block protection

- The encryption/decryption mechanism used to protect the Ki and OP is the NIST approved CKM_AES_KWP (PKCS # 11 definition) and where the default IV (per NIST SP800-38F) is used.