CURRENT STATUS, CHALLENGES AND THE ROAD AHEAD

CURRENT STATUS & COMING SOON

Mainnet - 10 IV 2018

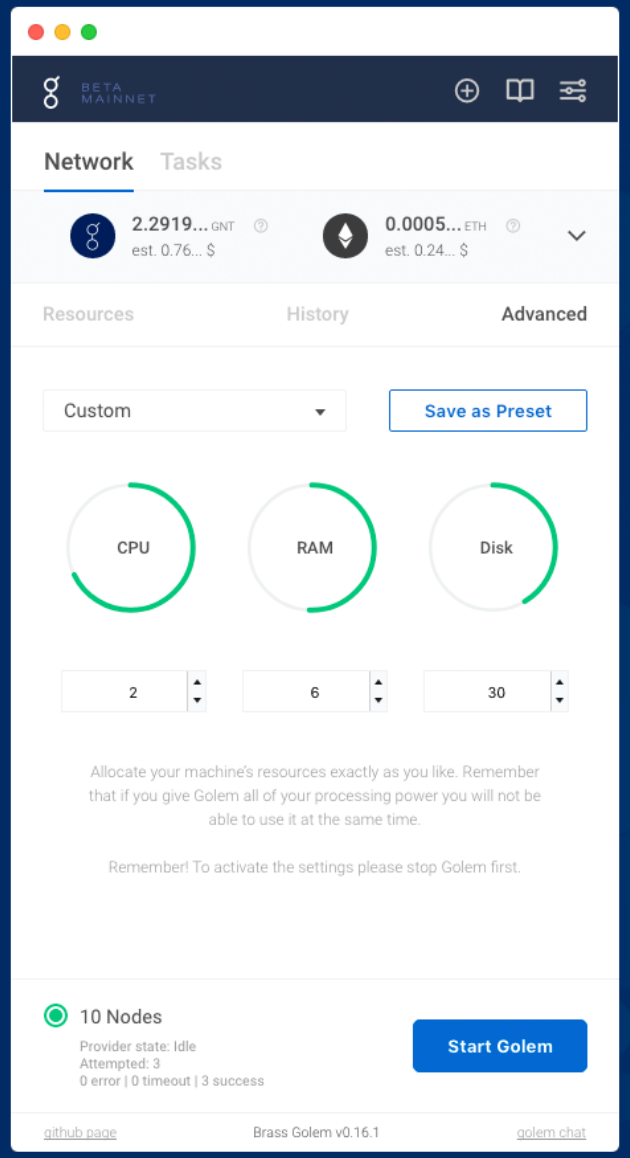
Concent (additional verification service)

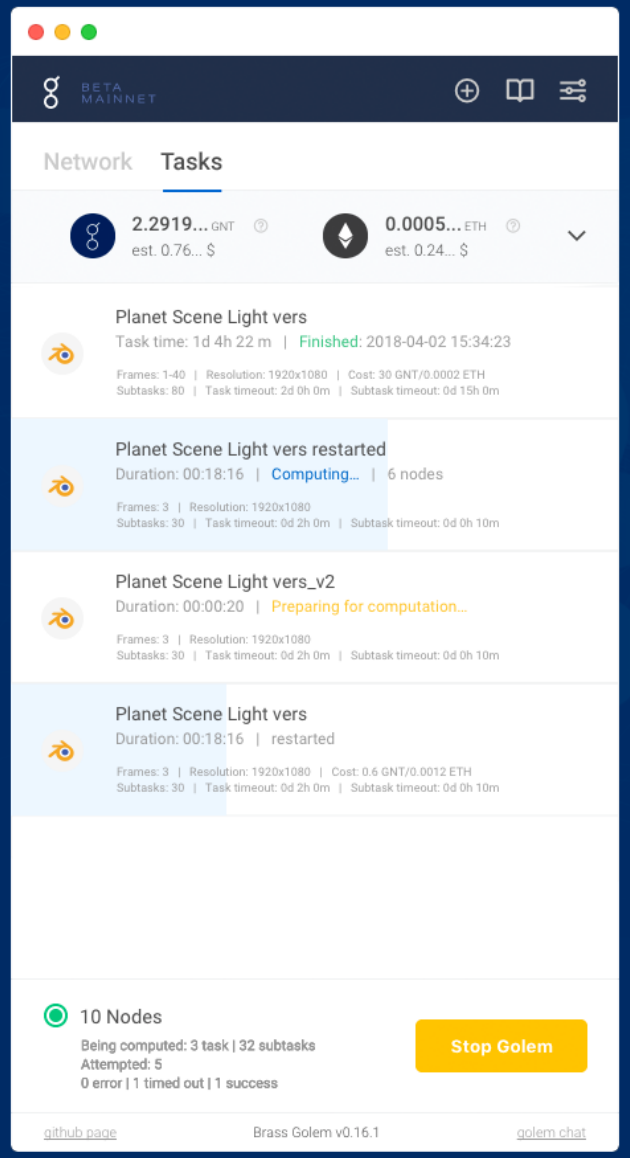
- all 5 use cases implemented, first 3 on testnet since June

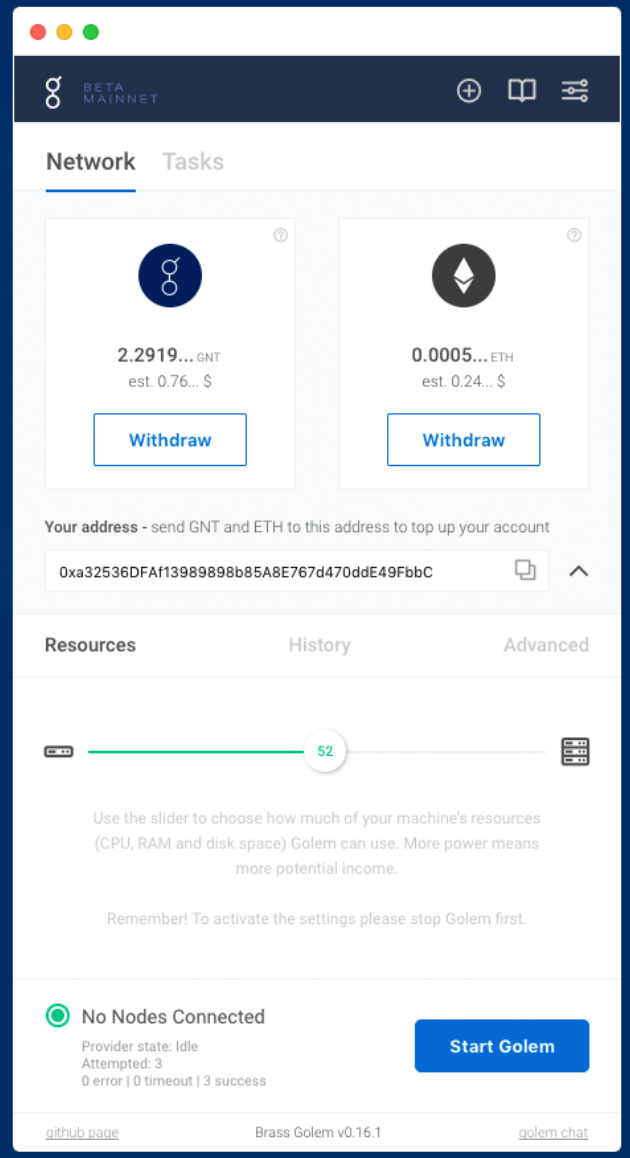
Brass - further development and UX changes

- Verification algorithm improvement (more on next slides!)
- Network optimizations for scalability and efficiency
- More user-friendly GUI (more on next slides!)
- Filter providers based on their machine capacity

GPU support - coming soon (working PoC in repo)


BETA MAINNET
Network
Tasks
2.2919... GNT
est. 0.76... $
0.0005... ETH
est. 0.24... $
Resources
History
Advanced
Custom
Save as Preset
CPU
RAM
Disk
2
6
30
Allocate your machine's resources exactly as you like. Remember that if you give Golem all of your processing power you will not be able to use it at the same time.
Remember! To activate the settings please stop Golem first.
10 Nodes
Provider state: Idle
Attempted: 3
0 error | 0 timeout | 3 success
Start Golem
github page
Brass Golem v0.16.1
golem chat


BETA MAINNET
Network
Tasks
2.2919... GNT
est. 0.76... $
0.0005... ETH
est. 0.24... $
Planet Scene Light vers
Task time: 1d 4h 22 m | Finished: 2018-04-02 15:34:23
Frames: 1-40 | Resolution: 1920x1080 | Cost: 30 GNT/0.0002 ETH
Subtasks: 80 | Task timeout: 2d 0h 0m | Subtask timeout: 0d 15h 0m
Planet Scene Light vers restarted
Duration: 00:18:16 | Computing... | 6 nodes
Frames: 3 | Resolution: 1920x1080
Subtasks: 30 | Task timeout: 0d 2h 0m | Subtask timeout: 0d 0h 10m
Planet Scene Light vers_v2
Duration: 00:00:20 | Preparing for computation...
Frames: 3 | Resolution: 1920x1080
Subtasks: 30 | Task timeout: 0d 2h 0m | Subtask timeout: 0d 0h 10m
Planet Scene Light vers
Duration: 00:18:16 | restarted
Frames: 3 | Resolution: 1920x1080 | Cost: 0.6 GNT/0.0012 ETH
Subtasks: 30 | Task timeout: 0d 2h 0m | Subtask timeout: 0d 0h 10m
10 Nodes
Being computed: 3 task | 32 subtasks
Attempted: 5
0 error | 1 timed out | 1 success
Stop Golem
github page
Brass Golem v0.16.1
golem chat


BETA MAINNET
Network
Tasks
2.2919... GNT
est. 0.76... $
Withdraw
0.0005... ETH
est. 0.24... $
Withdraw
Your address - send GNT and ETH to this address to top up your account
0xa32536DFAf13989898b85A8E767d470ddE49FbbC
Resources
History
Advanced
52
Use the slider to choose how much of your machine's resources (CPU, RAM and disk space) Golem can use. More power means more potential income.
Remember! To activate the settings please stop Golem first.
No Nodes Connected
Provider state: Idle
Attempted: 3
0 error | 0 timeout | 3 success
Start Golem
github page
Brass Golem v0.16.1
golem chat

VERIFICATION ALGORITHM IMPROVMENTS

Decision tree based on:

- Mean squared error for wavelet transform results on three bands - low, medium and high pseudo-frequency
- Structural similarity (SSIM)
- Histograms correlation
- Edge detection and edge density

Scene "1971 Mustang Coupe" by Obsidian71 https://www.blendswap.com/blends/view/53262

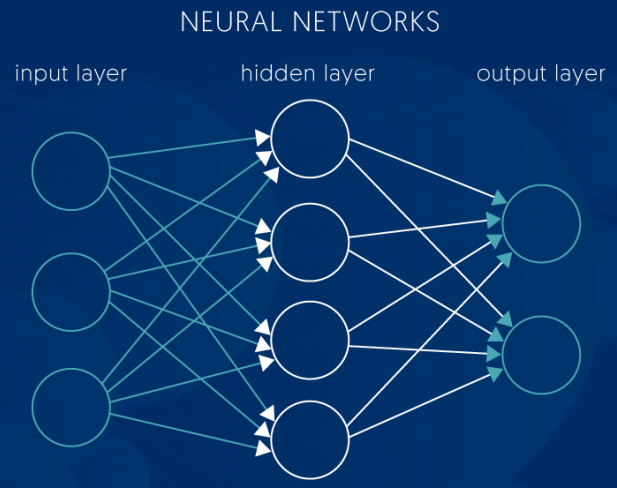
NEW USECASES

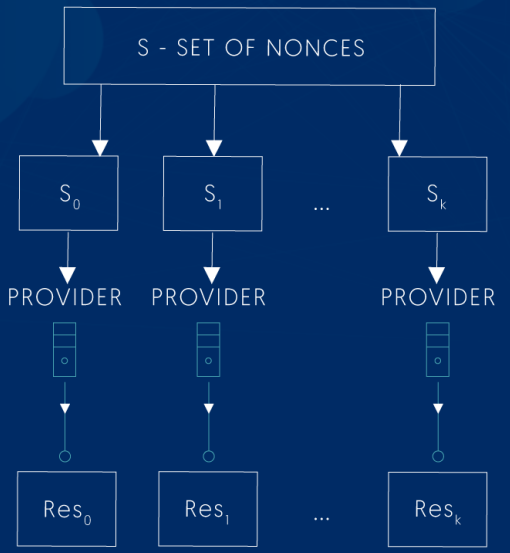
New Task API project

New use cases

- machine learning with rendering [in progress]
- additional renders
- video transcoding
- mining
- ...

Searching for other use cases





WHAT IS A GOOD GOLEM USE CASE (TODAY)

Requirements:

- Ability to run significant part of a task in a parallel manner without the need to often synchronize results
- Small or moderate size of inputs & outputs, so computation takes significantly more time than sending data

Nice to have:

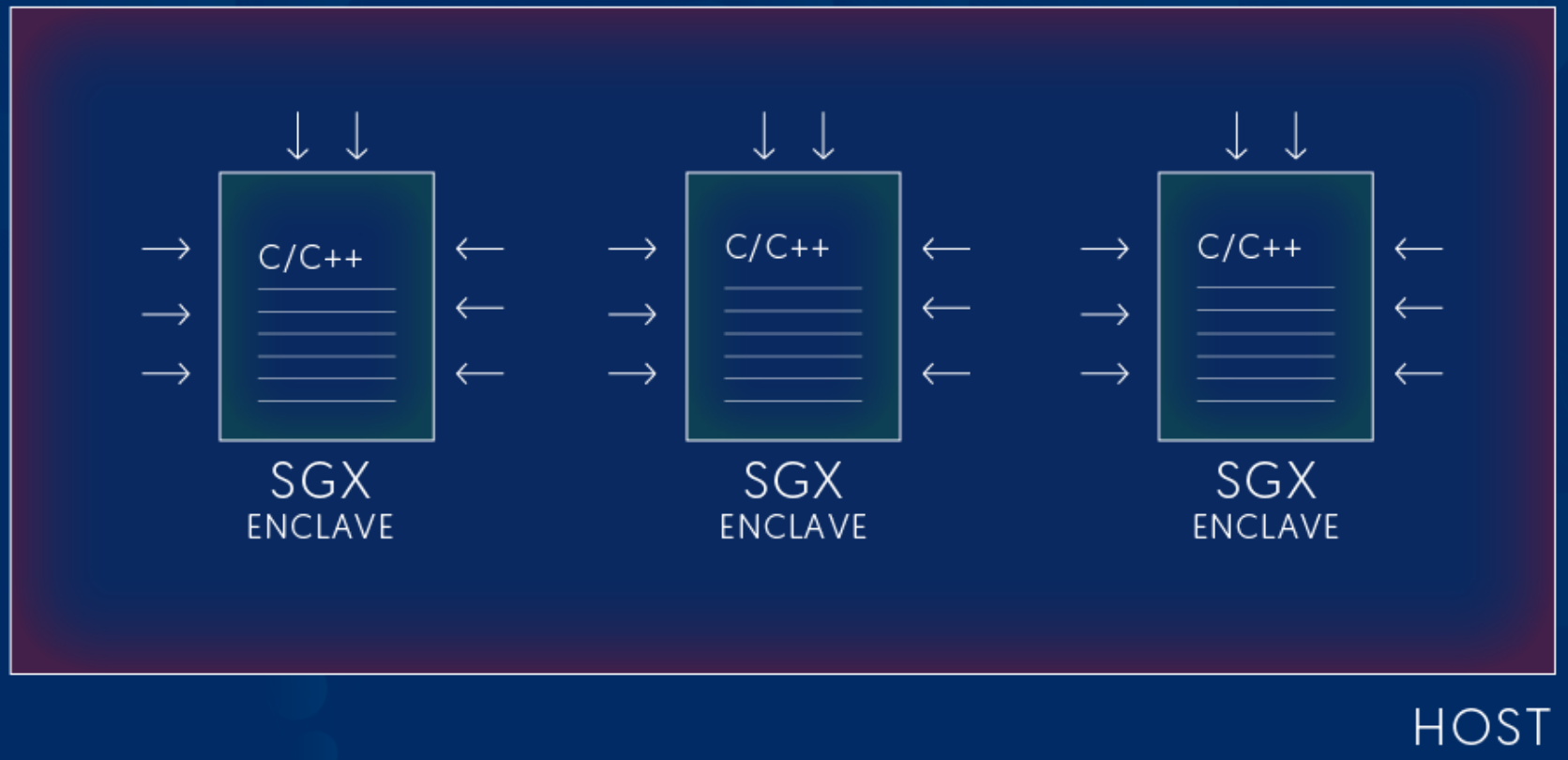
- Open source software
- Non-sensitive input data
- A deterministic result, simple verification algorithm or Proof of Work

WRITE TO US!

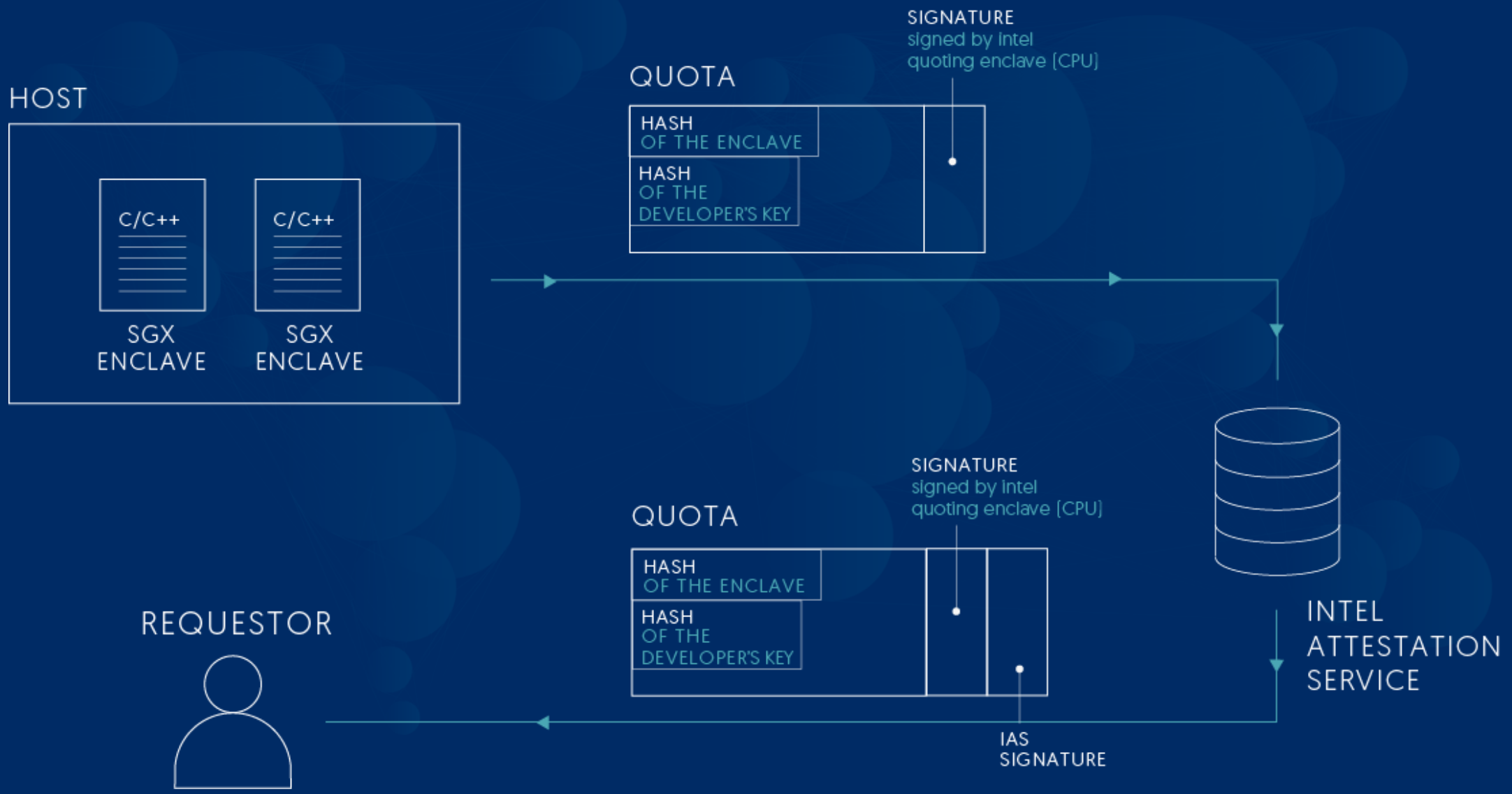
CONTACT@GOLEM.NETWORK

SGX

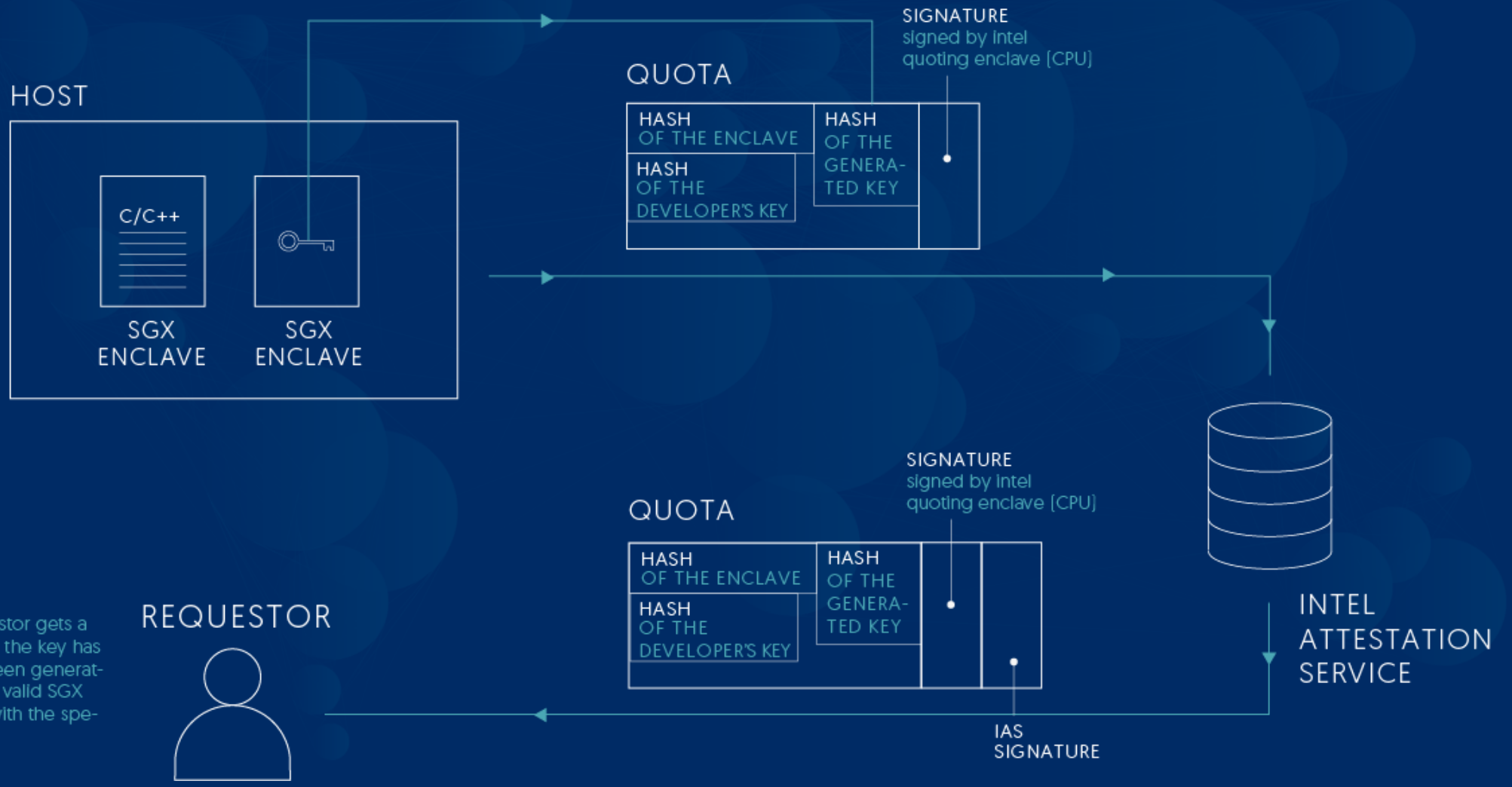
Intel Software Guard Extensions



REMOTE ATTESTATION

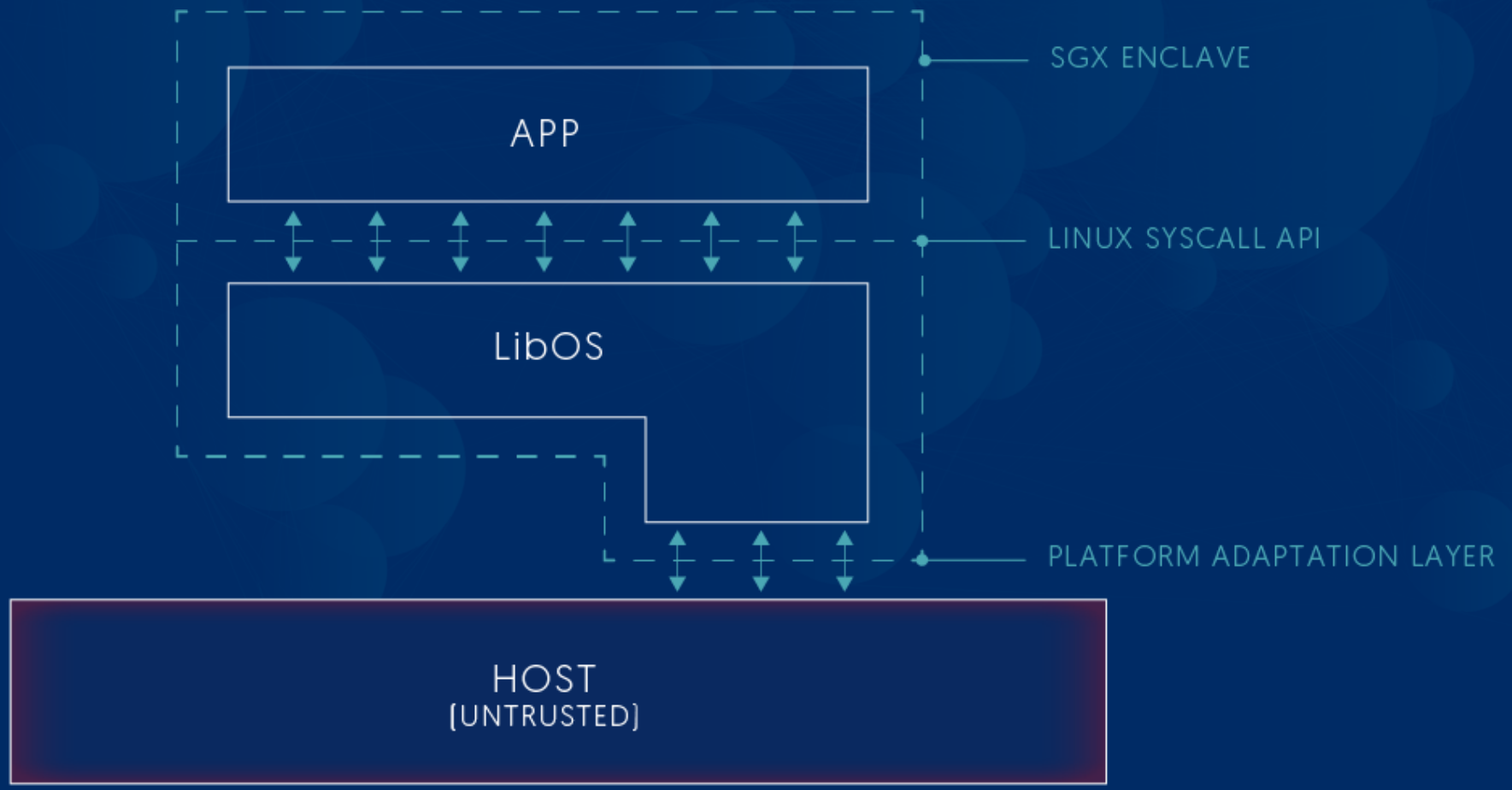


REMOTE ATTESTATION



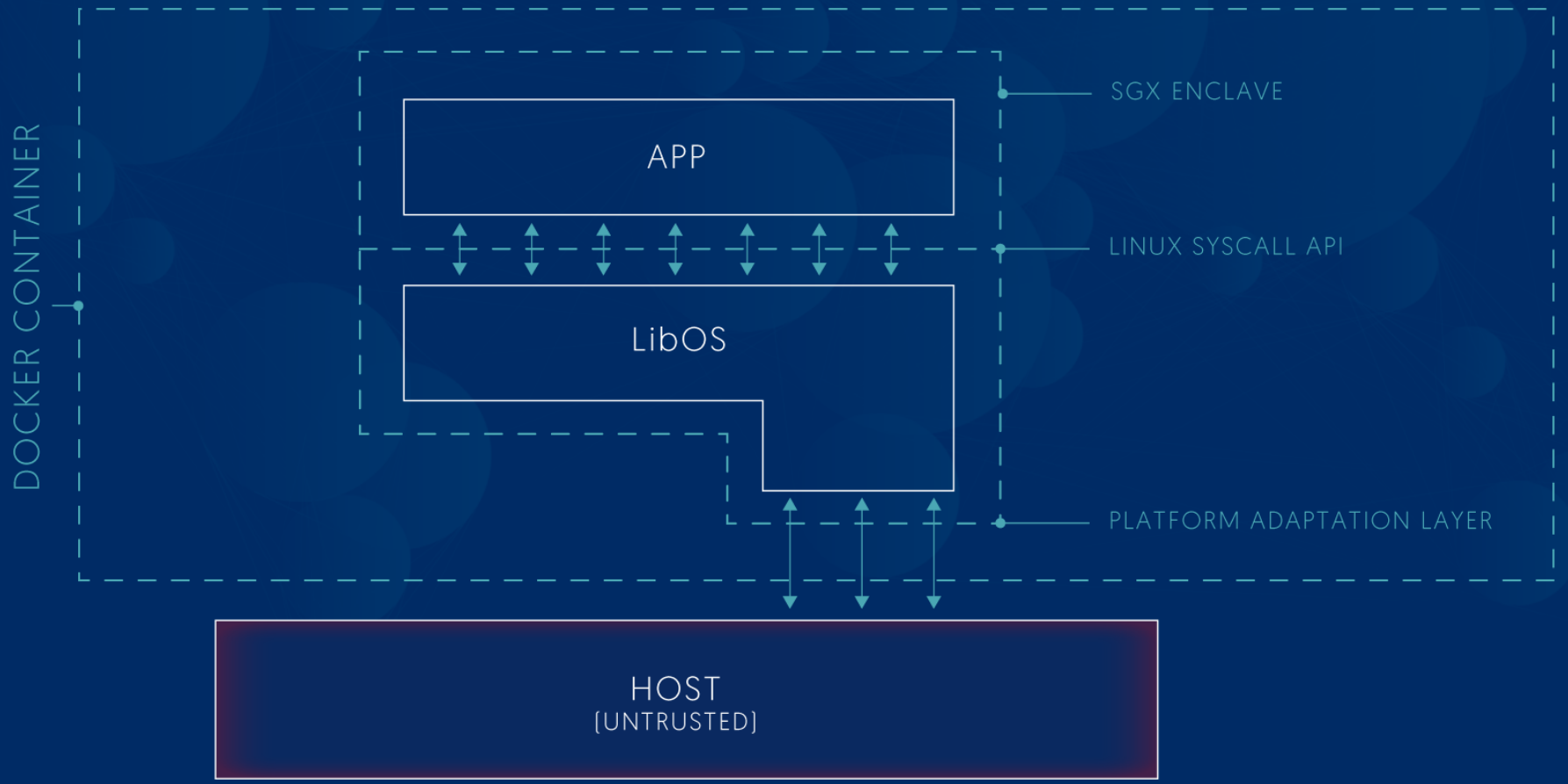
GRAPHENE

A library OS for Linux multi-process applications, with Intel SGX support



GRAPHENE-NG

Now with Docker support!



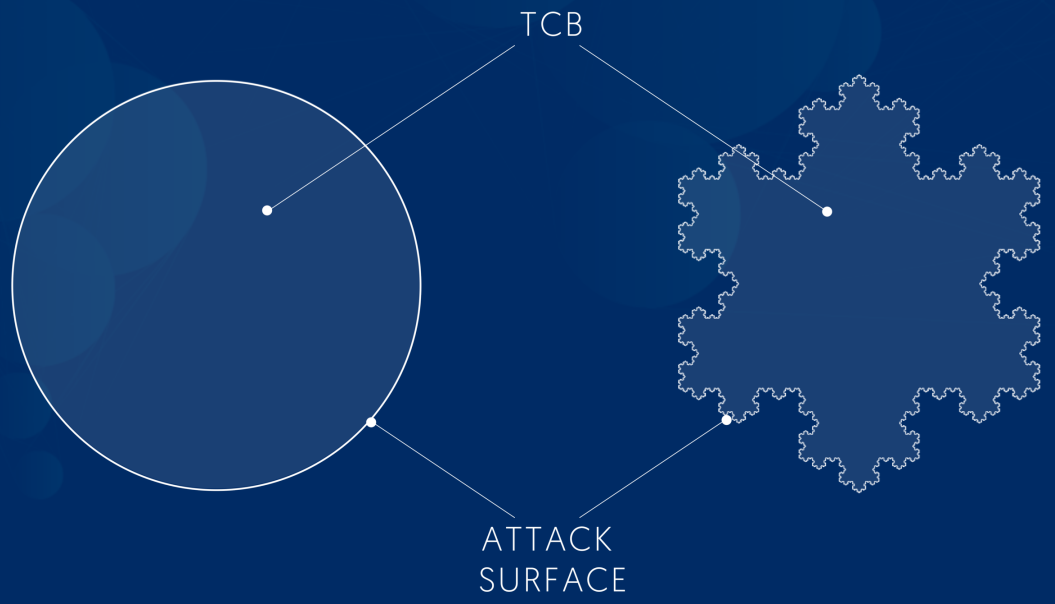
TCB VS ATTACK SURFACE

”

Trusted computing base: The set of all hardware, firmware, and/or software components that are critical to the security of a computer system

Attack surface of a software environment: The sum of the different points (the 'attack vectors') where an unauthorized user (the 'attacker') can try to enter data to or extract data from the environment

-WIKIPEDIA



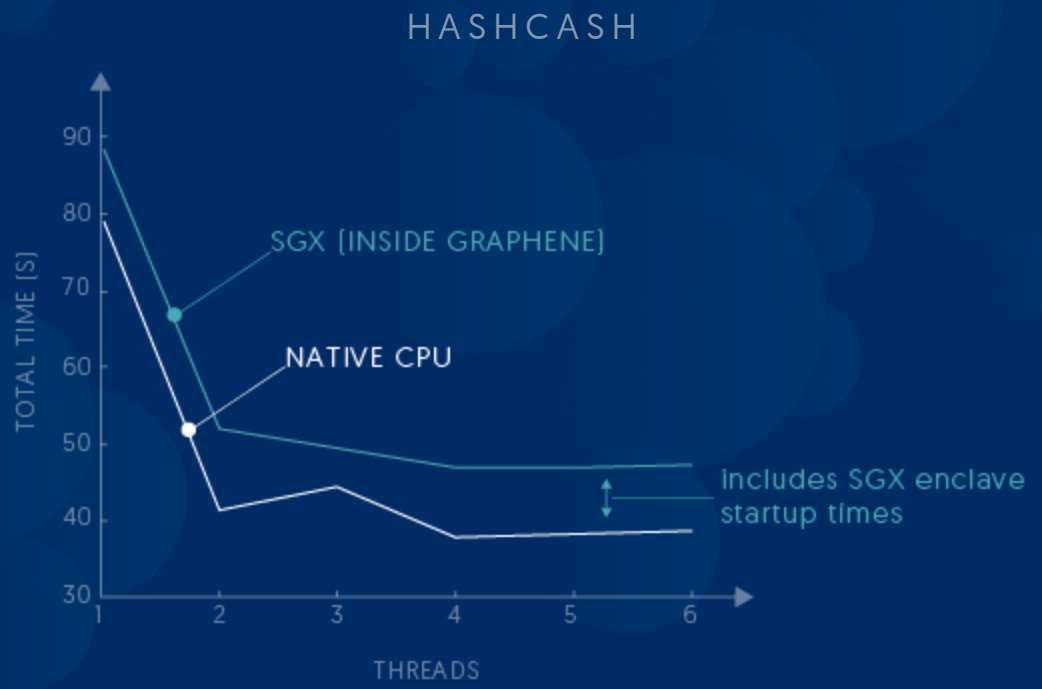
WHY ITS IMPORTANT (AND GREAT!)

vanilla Intel SGX code	**Graphene-ng with Docker**
C++	Arbitrary binary (any programming language)
Code written and compiled for SGX	Arbitrary binary
Static interaction with host (ECALL and OCALL)	No need to modify your code
No IO operations	IO operations
Linux, Windows, macOs	Linux

SAME SECURITY LEVEL

EFFICIENCY

Compute-intensive algorithm

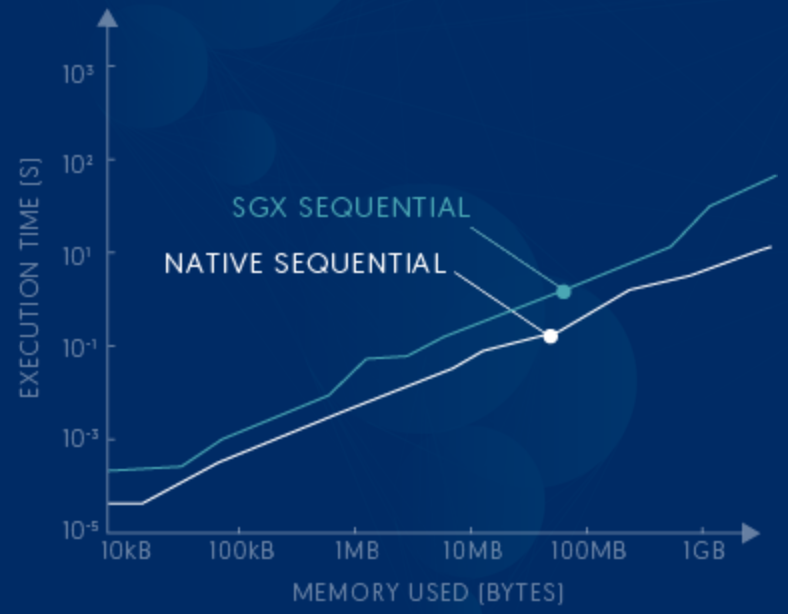


INTEL I7-7500U CPU (4 THREADS)

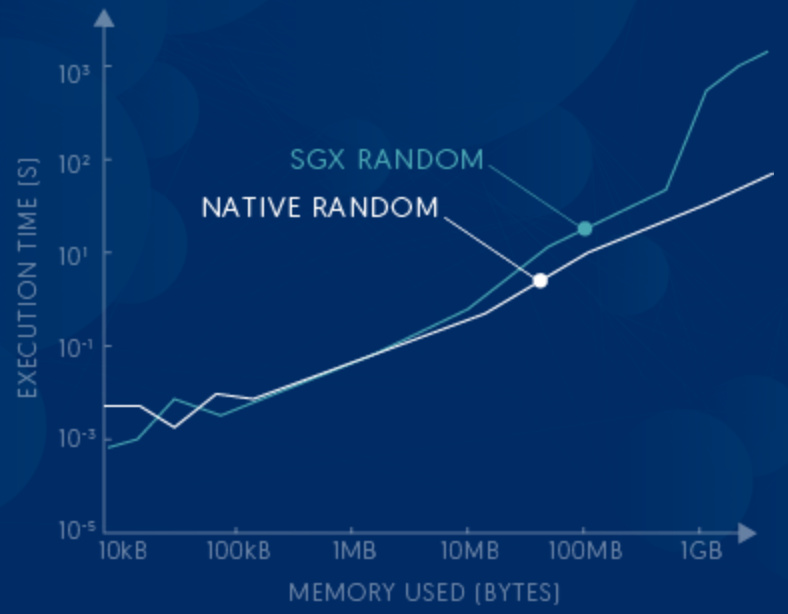
EFFICIENCY

Memory-intensive algorithms

SEQUENTIAL ACCESS PATTERN



RANDOM ACCESS PATTERN



INTEL I7-7500U CPU (4 THREADS)

IN PROGRESS

CLAY

— an optimized & more generalized version of Golem

MARKETPLACE

— improved task selection & provider selection algorithms for Golem

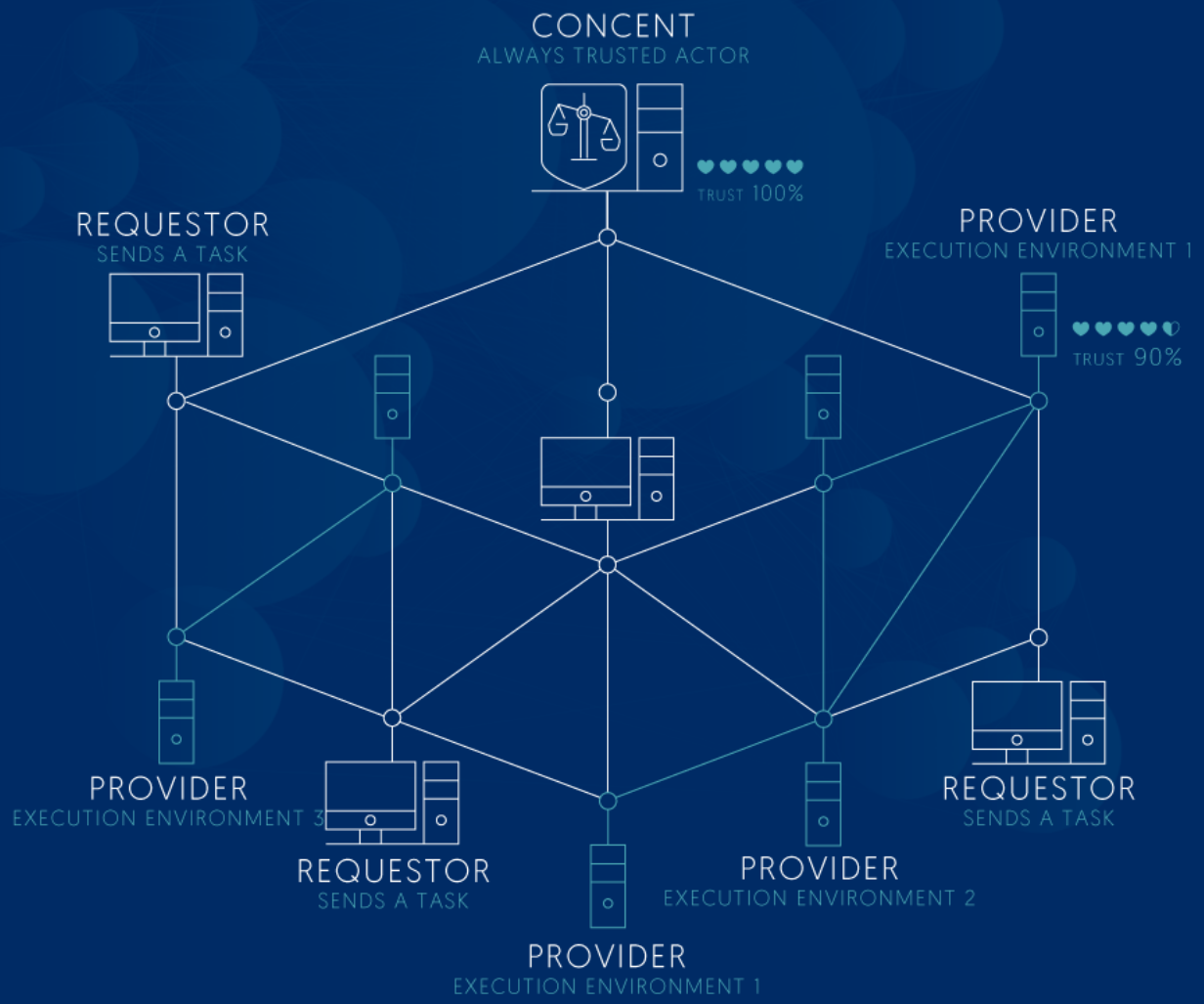
UNLIMITED

— Golem version for data centers & trusted providers

SGX

— Graphene-ng based toolkit for decentralizing server solutions (eg. Concent).

... and more



MAREKTPLACE PROVIDER SELECTION FUNCTION

Adversarial Multi-Armed Bandit problem

Exp3C - a generalization of the Exp3 algorithm from [Auer, Cesa-Bianchi, Fischer2002]

$$v_j = w_j / c_j$$

$$H = 1 / \sum(1/c_j)$$

$$p_j = H \cdot \gamma / c_j + (1 - \gamma) \cdot (v_j / V)$$

$$w_i = w_i \cdot exp(\gamma \cdot x / K)$$

THANK YOU

golem

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