



COMPUTING EVERYWHERE



INTENSIVE FARMING

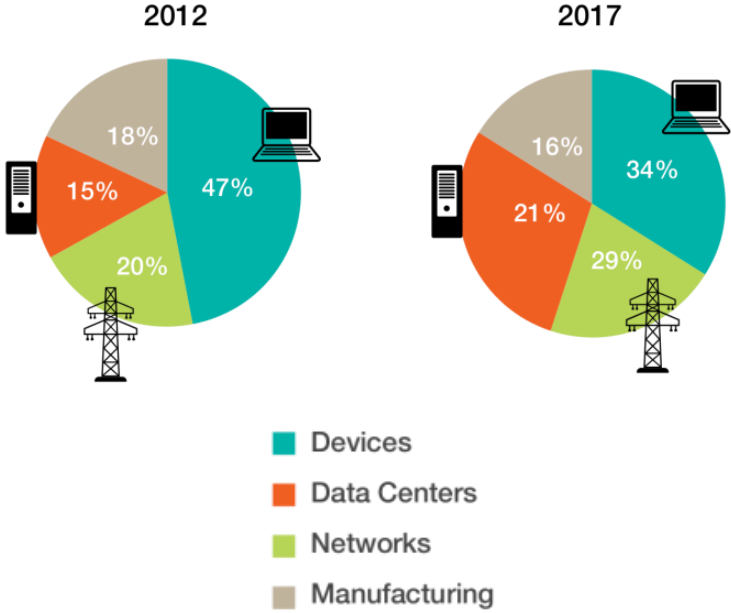
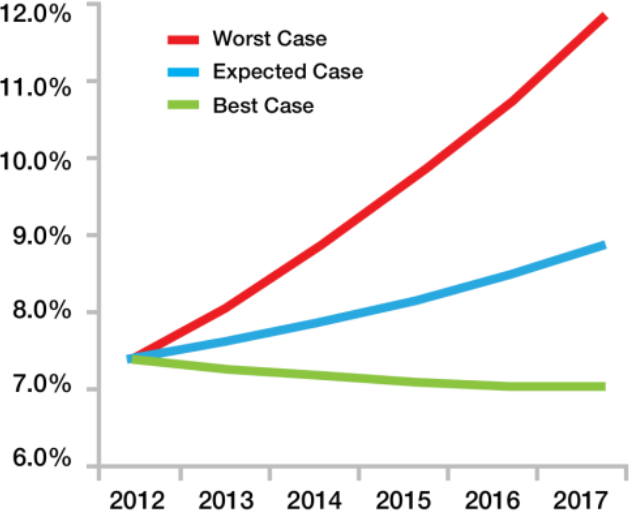




INTENSIVE FARMING

# HEAVY TRENDS

## Electricity demand growth of the ICT sector



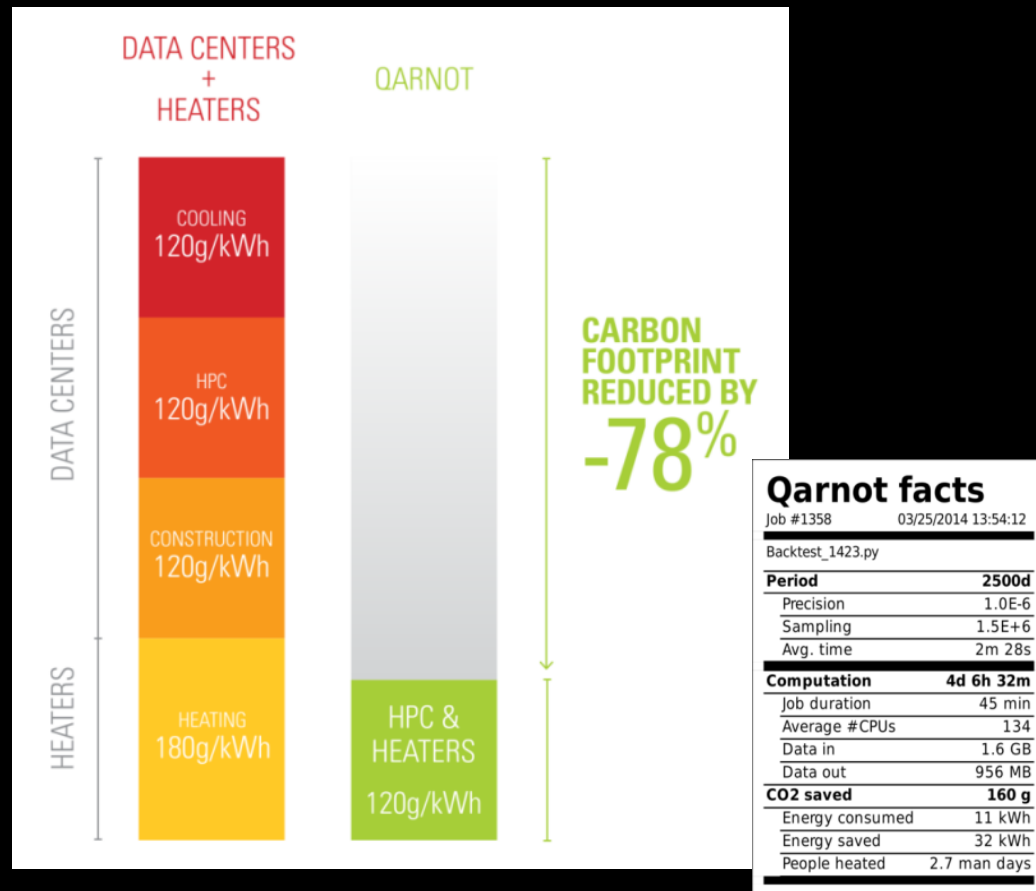




THE Q.RAD  
DIGITAL HEATER



# COMPETITIVE & SUSTAINABLE BY DESIGN



# DUAL SIDED BUSINESS MODEL



CLOUD  
SERVICE



HEATER  
HOSTS

# CLOUD COMPUTING FOR FINANCE

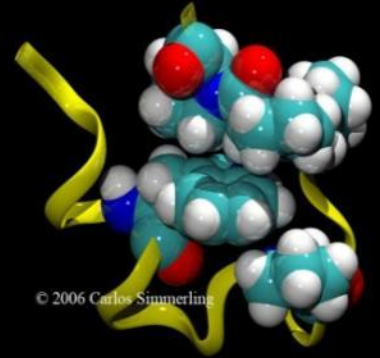
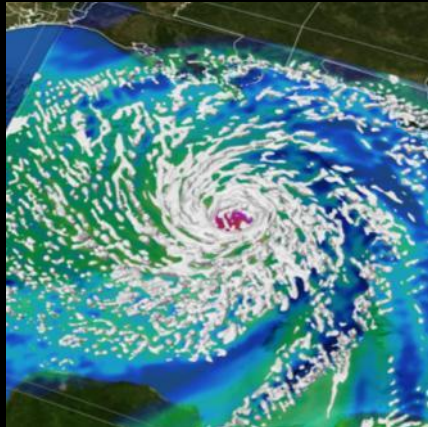
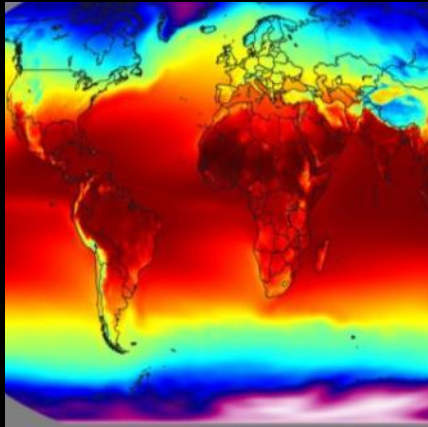




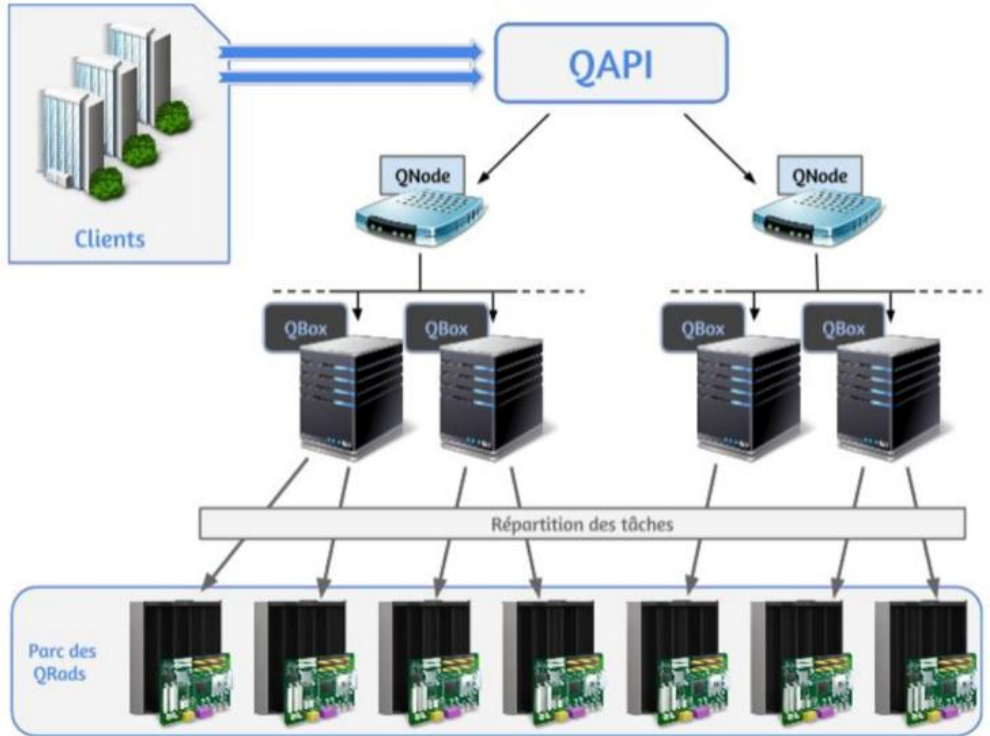
# CLOUD COMPUTING FOR 3D RENDERING



# CLOUD COMPUTING FOR RESEARCH



# BARE METAL ARCHITECTURE OVERVIEW



- SECURE ACCESS MANAGEMENT
- CLUSTER MANAGEMENT & MONITORING
- ENERGY / THERMAL MANAGEMENT
- SESSION MANAGEMENT
- JOB MANAGEMENT & MONITORING
- DATA RESOURCE MANAGEMENT
- RESULTS MANAGEMENT



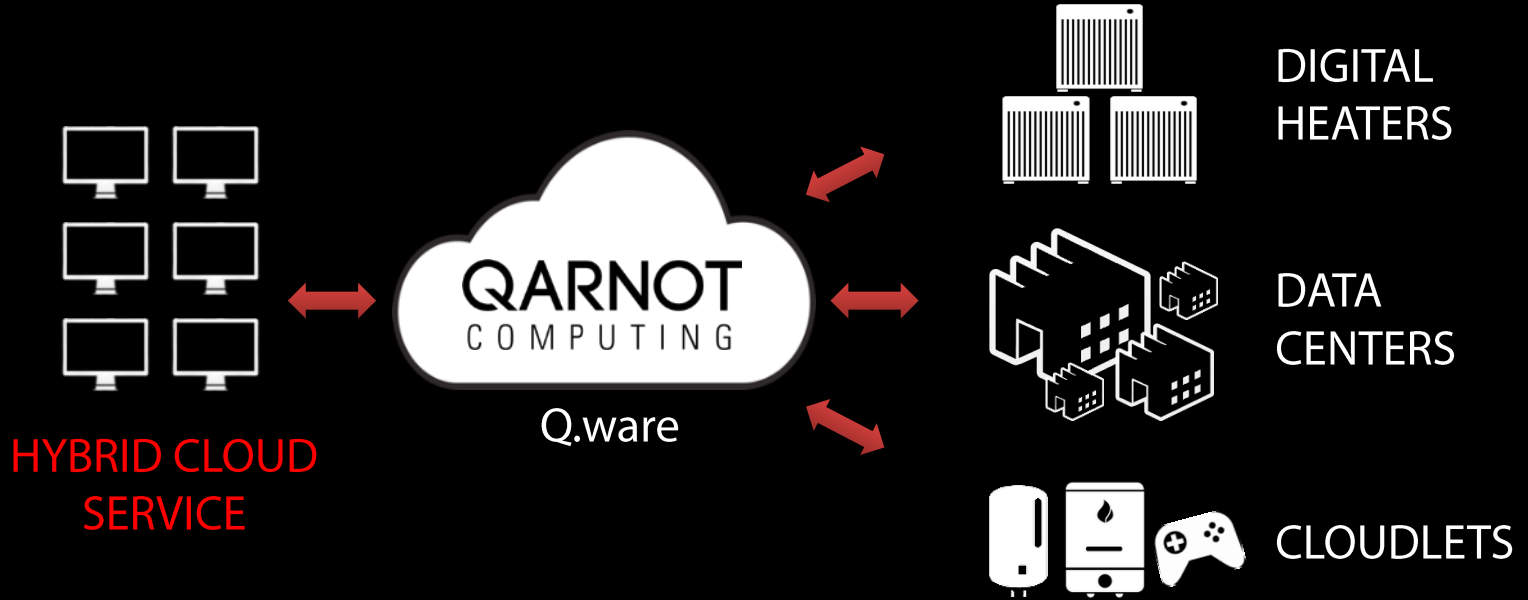
# DUAL SIDED BUSINESS MODEL



# DUAL SIDED BUSINESS MODEL



# Q.WARE HYBRID CLOUD DISTRIBUTION PLATFORM





# Q.WARE HYBRID CLOUD DISTRIBUTION PLATFORM



## FULL STACK ENCRYPTION

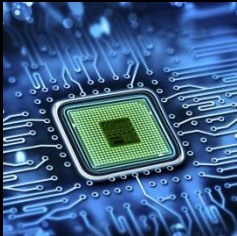
State-of-the-art security modules for encryption and authentication to propose an end-to-end protection :

- REST API through HTTPS or leased line.
- TLS/IPSEC with client authentication between all distribution and computing nodes
- Stateless Q.rad computing nodes (no storage).



## CRAFT YOUR PAYLOAD

- Several ready-to-use payloads available
- Mainly OSS : Blender, Python, R, ...
- All payloads are driven through Qarnot API.
- New payloads crafted by/with our R&D team.



## BARE METAL INFRASTRUCTURE

Each node is fully dedicated to a single client job to guarantee performance and total insulation :

- Automated in-memory booting process
- Predefined payload bootstrapping.
- Docker container based or VM (Vbox, Qemu KVM)
- Data resources mounting for job execution.



## CONNECT THROUGH QARNOT'S REST API

- Start/stop jobs and host provisioning
- Monitor job execution (logs, CPU/RAM, progress)
- Resources and results management
- Event notification

# BLENDER

powered by QARNOT COMPUTING

Q, Blender - Google Chrome  
blender.qarnot.net/app/output/view/id/3315

Q BLENDER Credits: 114940 Farm Availability: 0%







paul.benoit@qarnot-computing.com

**caminandes** shots/01e\_hand/01e\_comp.blend Paid **0x0** 1016 - 1021 Blender 2.72 - Cycles (10 Samples) 1920x1080 381 Credits Stop Download

Progress : 71 %  
Upload Progress : 44 %  
Working CPU : 144

Elapsed Time : 00 Hours 04 Minutes 52 Seconds  
Computation Time : 06 Hours 20 Minutes 54 Seconds

Output

 1016	 1017	 1018	 1019	 1020	 1021
---	---	---	--	---	---

Output

## Q.API RESTFUL

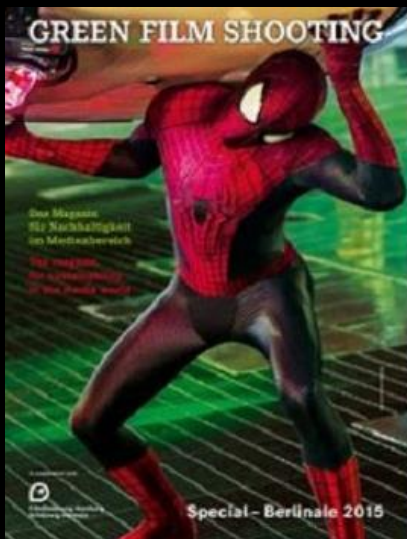
```
1 import qapy
2 import sys
3 import os
4
5 print("Loading config...")
6 api = qapy.QApy('qarnot.conf')
7
8 print("Creating task...")
9 with api.create_task("BigBuckBunny_Intro", "blender", "[1-25]") as task:
10     for disk in api.disks():
11         print("Reusing disk " + disk.description)
12         task.resources = disk
13         break
14
15     print("Sync resources from 'input' directory")
16     task.resources.sync_directory("BigBuckBunny/", True)
17     task.resources.locked = True
18     task.resources.commit()
19
20     print("Setting constants...")
21     task.constants['BLEND_FILE'] = "Intro.blend"
22     task.constants['BLEND_FORMAT'] = "PNG"
23     task.constants['BLEND_ENGINE'] = "CYCLES"
24     task.constants['BLEND_CYCLES_SAMPLES'] = 1000
25
26     print("Submitting task...")
27     task.submit()
28
29     print("Waiting for task completion...")
30     task.wait()
31
32     print("Retrieving results in 'output' directory")
33     if not os.path.exists("output"):
34         os.makedirs("output")
35     task.download_results("output")
```



# QARNOT FOR 3D RENDERING



# QARNOT FOR GREEN 3D RENDERING



## Qarnot facts

Job #1358 03/25/2014 13:54:12

Backtest\_1423.py

Period	2500d
Precision	1.0E-6
Sampling	1.5E+6
Avg. time	2m 28s

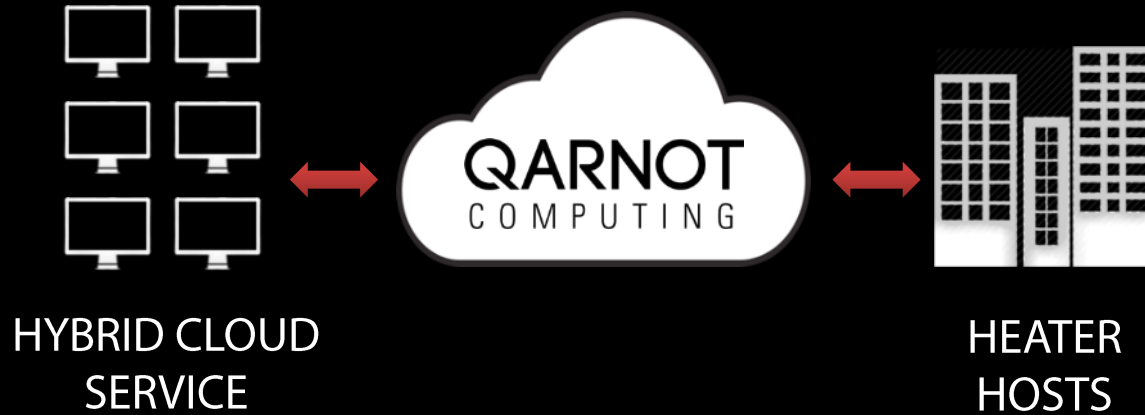
### Computation 4d 6h 32m

Job duration	45 min
Average #CPUs	134
Data in	1.6 GB
Data out	956 MB

### CO2 saved 160 g

Energy consumed	11 kWh
Energy saved	32 kWh
People heated	2.7 man days

# DUAL SIDED BUSINESS MODEL



# DUAL SIDED BUSINESS MODEL





## A NEW Q.RAD FOR SMART HOME REVOLUTION



DEPLOYED IN EVERY ROOM



SENSORS & INTERFACES



EMBEDDED INTELLIGENCE



LOW-KEY / PRIVACY



ENERGY EFFICIENCY





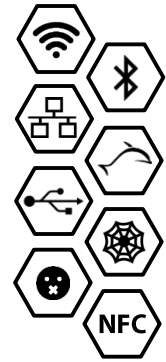
SENSE



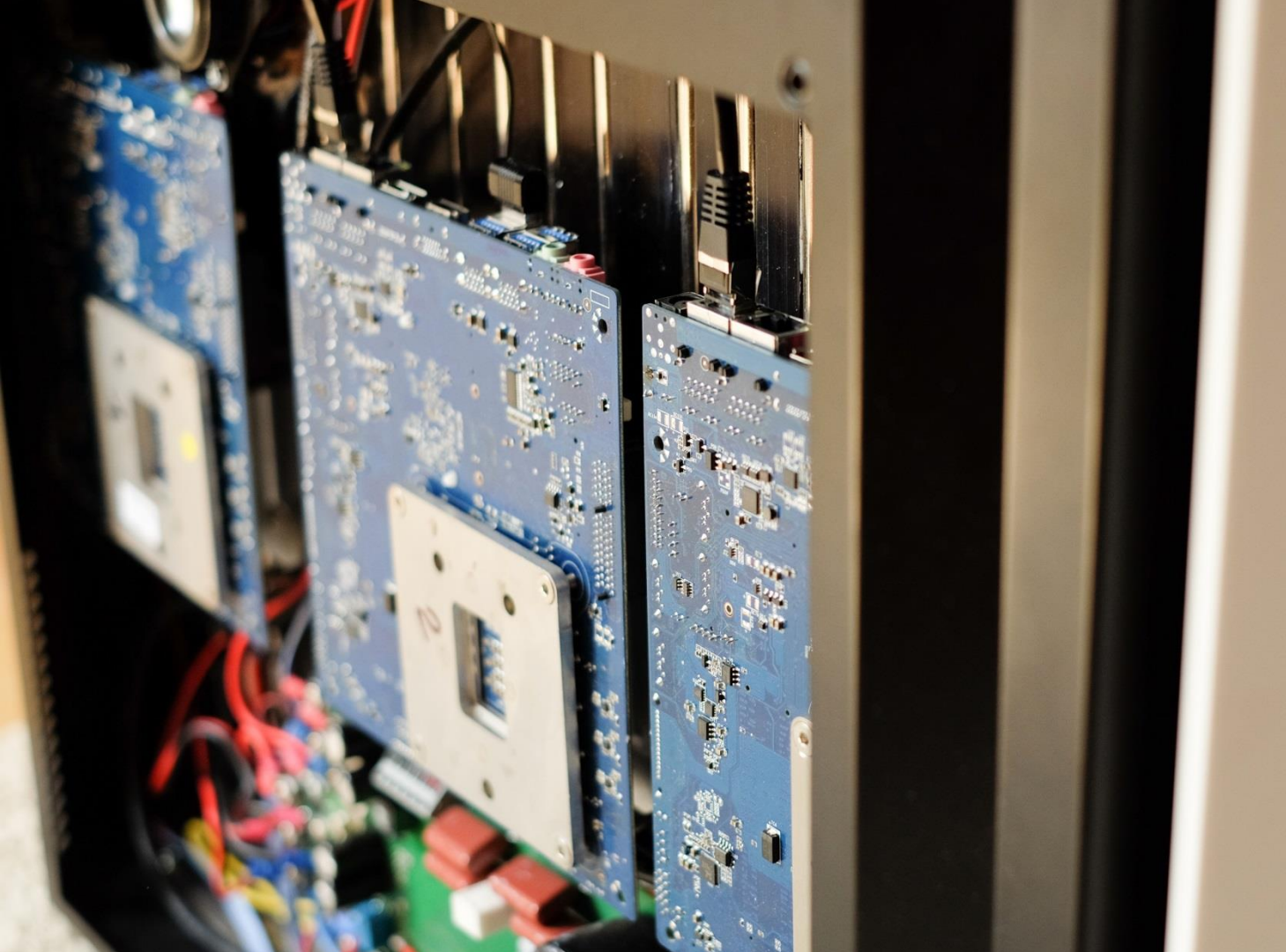




# COMMUNICATE







COMPUTE



INCIDENTALLY  
IT'S A HEATER





**QARNOT**  
COMPUTING EVERYWHERE