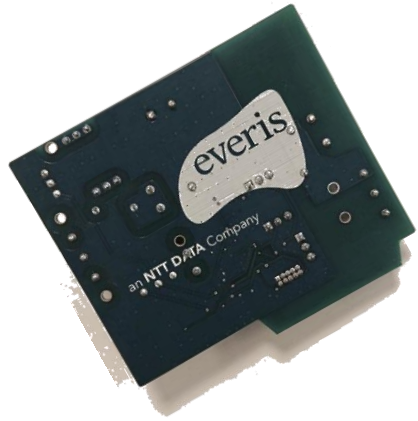
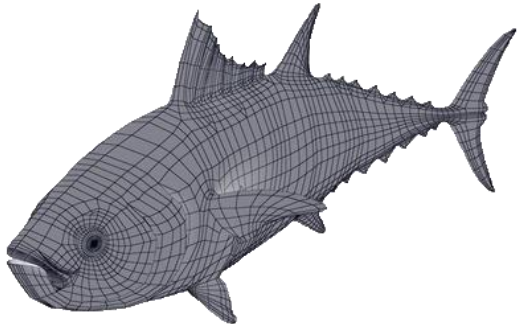
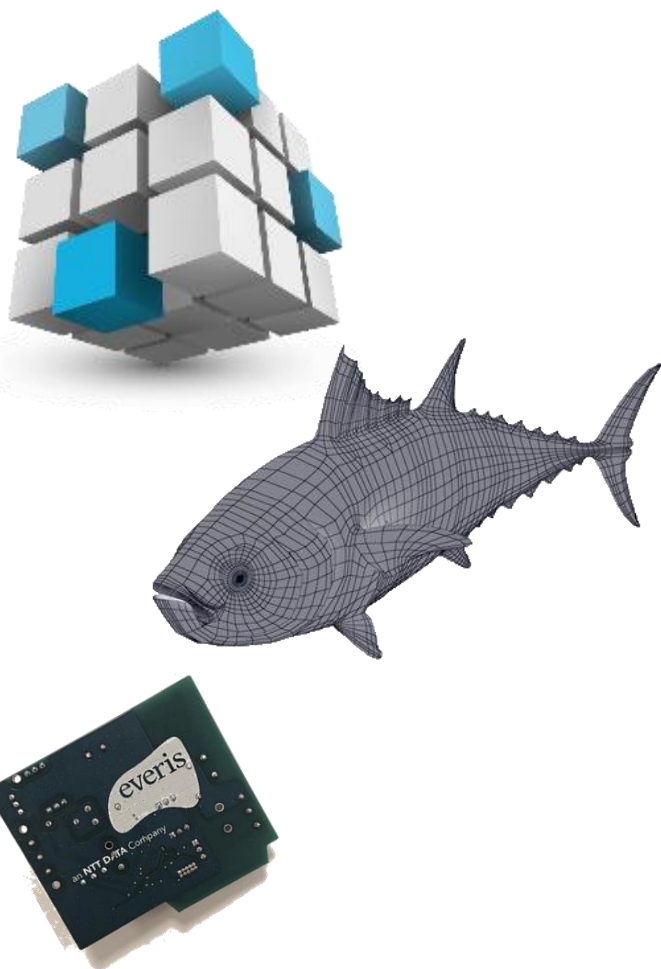




Blockchain / IoT Supply Chain management



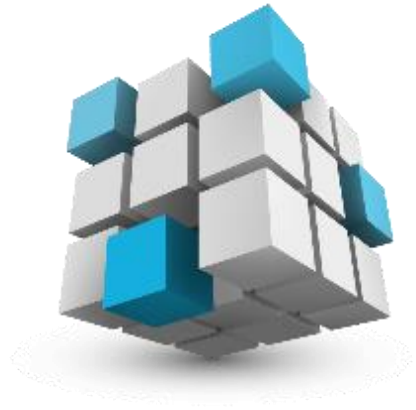
Blockchain & IoT en cadena de suministro



Registrar y Certificar la trazabilidad de una especie a lo largo de su proceso productivo:

- Aumentar **visibilidad** de la cadena de valor
- **Información detallada** para el consumidor
- **Evitar fraude**
- Controlar **certificación** alimentaria
- **Reducción de trámites** administrativos
- **Control** de la cadena de **suministro**. Responsabilidad, custodia,....

Blockchain & IoT en cadena de suministro



Tecnología Blockchain

- **Consenso**
- Control sobre el grado de **descentralización**
- **Criptografía**
- **Inmutabilidad**
- Capacidad de **virtualización** (Internet del valor)

Blockchain & IoT en cadena de suministro

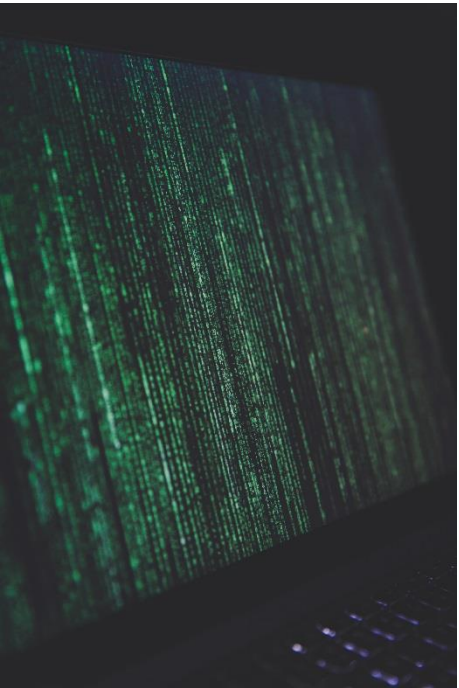
Tecnología Blockchain Consenso y nivel de descentralización



El uso de unas **normas compartidas** en todos los nodos permite componer un nivel de consenso, adecuado a las necesidades de cada proyecto, y al grado de descentralización que se quiera establecer.

	lotería	votación	Proof of Work (Bitcoin)
Velocidad	● ● ● ● ●	● ● ● ● ●	●
Escalabilidad	○ ○ ○ ○ ○	○ ○ ○	○ ○ ○ ○ ○
Resolución	● ● ●	● ● ● ● ●	●

Blockchain & IoT en cadena de suministro



Tecnología Blockchain
Criptografía

Certificados digitales

Curvas elípticas

Claves

Hash

nPf8Yf4nanNwod11uJezFiOYcSkX7wmqqnoboTeE+Mc6NgdwfyCBuupKI35a4tOXI8wNgGeQmoyc65QMkLHWNQ==

Blockchain & IoT en cadena de suministro



Tecnología Blockchain
Inmutabilidad

Cada nuevo registro se añade a los anteriores

No se puede borrar ni alterar la información guardada

Blockchain & IoT en cadena de suministro



Tecnología Blockchain **Tokenización**

Podemos digitalizar y compartir cualquier entidad

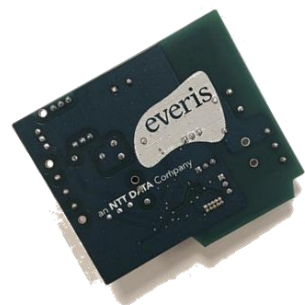
- Criptomonedas
- Energía
- Mercancías
-

nPf8Yf4nanNwod11uJezFiOYcSkX7wmqqnoboTeE+Mc6NgdwfyCBuupKI35a4tOXI8wNgGeQmoyc65QMkLHWNQ==

Blockchain & IoT en cadena de suministro

Tecnología IoT (Internet of Things)

Es el habilitador para **integrar** el mundo **físico** con el mundo **digital**



Sensores ...

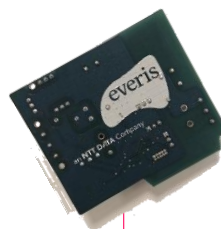
... Decisión & Comunicación...

Temperatura
Luz
Localización
Humedad
Ultrasonidos
Vibración
Corriente eléctrica

....
Cualquier sensor, según
requerimientos



IoT Sensors

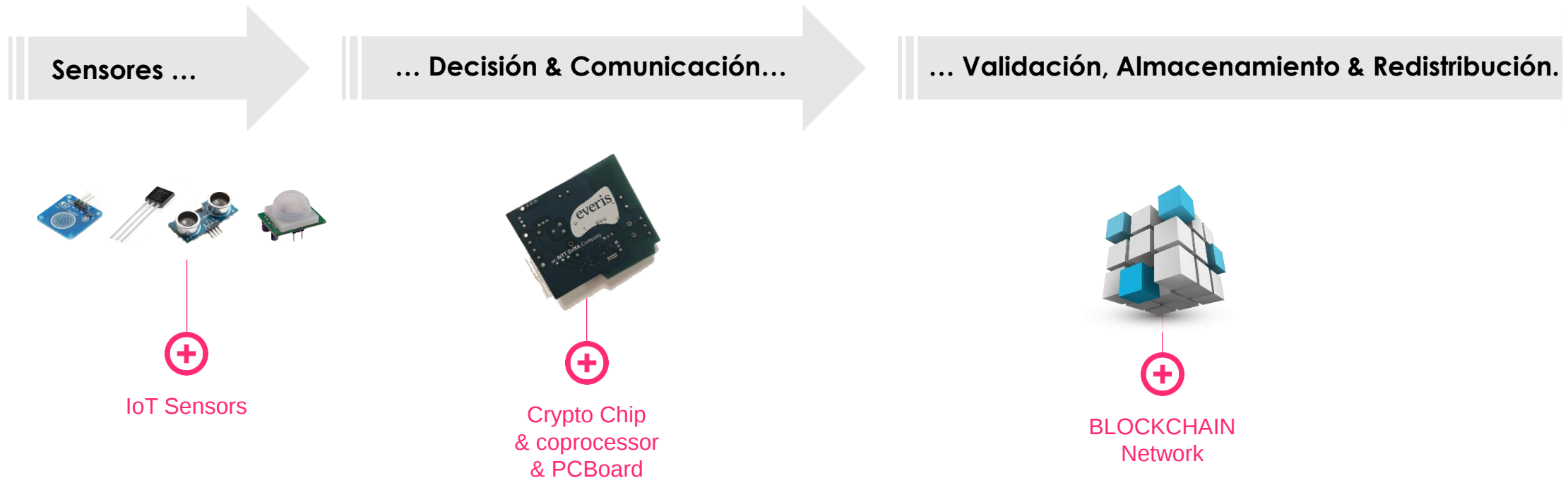


Crypto Chip
& coprocessor
& PCBoard

Inteligencia – Coprocesador & Firmware
Módulo de Comunicaciones
Criptochip -- Seguridad

Blockchain & IoT en cadena de suministro

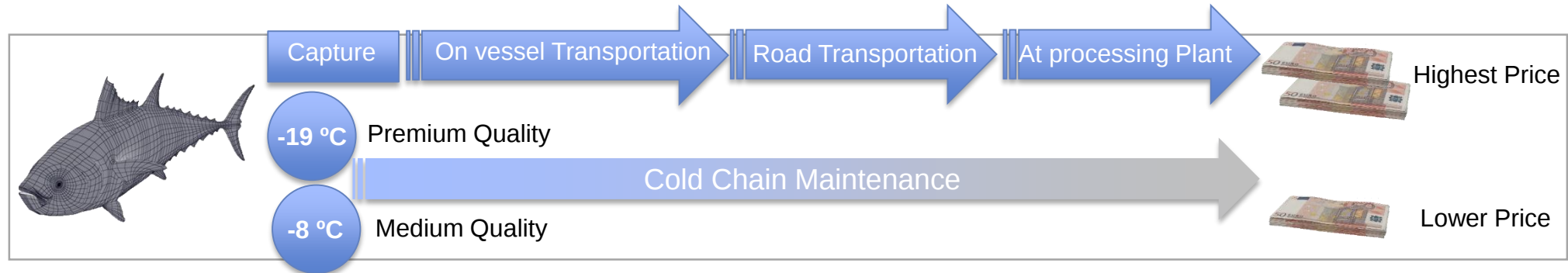
Integración IoT & Blockchain



Blockchain & IoT en cadena de suministro: ejemplo

Business requirements

Red Tuna meat is an expensive product whose **price depends on** Fishing and **Storage conditions** during the supply chain.
Premium quality Tuna must be stored at least at -19°C from the moment the fish is caught at the fishing boat.
Medium quality Tuna (aimed for canneries) must be stored at least at -8°C from the moment the fish is caught at the fishing boat.



Current state of the art **does not provide** a monitoring solution capable of:

State of the Art

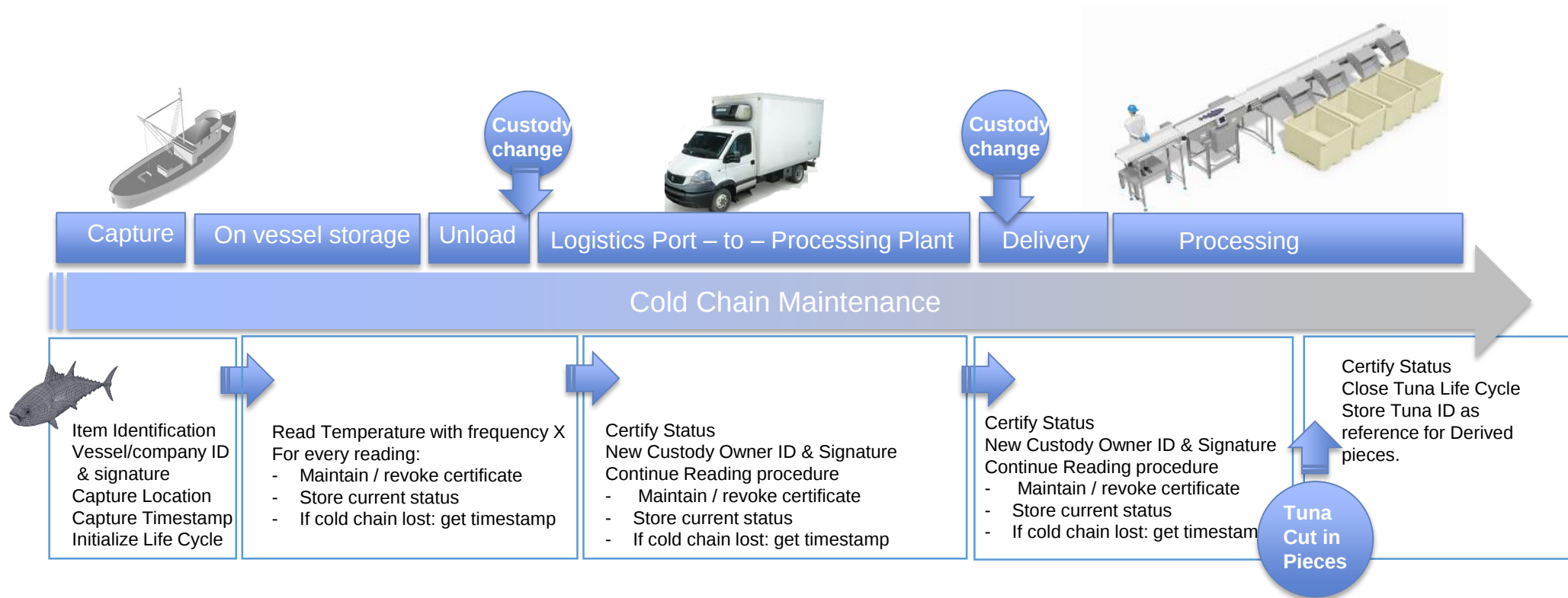
- **Full traceability** during the different supply chain stages
- **Accurate control** of the **cold chain** during storage and transportation
- **Trusted Certification** of the Cold Chain Conditions.

As a result:

The problem

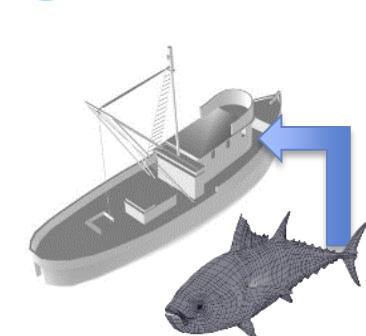
- **Real storage conditions** during the supply chain **can not be known with enough level of trust**
- **Malicious participants** in the business **can easily fake** the storage conditions
- **Authorities** and Sectorial **governing bodies** **can not assure** traceability, neither cold chain control
- **Final stages** of the supply chain (wholesalers, retailers, final consumers) **may be misled to pay premium prices** for low quality tuna
- **Health problems** (and **subsequent Liabilities**) **could arise** if non-compliant fish arrives to the end of the supply chain

Blockchain & IoT en cadena de suministro: ejemplo

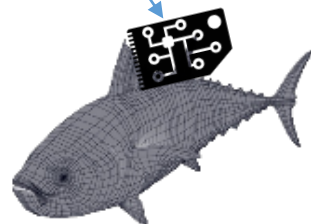


Blockchain & IoT en cadena de suministro: ejemplo

01 Tuna captured



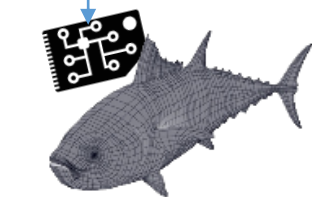
Control device attached
Vessel signature



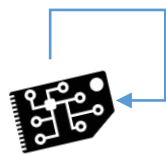
Tuna is tokenized with
status OK

02 On vessel storage

Temperature Control



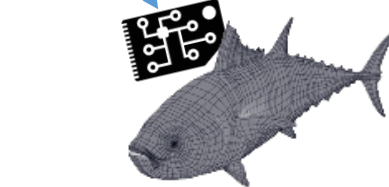
If temperature above legal
limit, token is changed:



Change status to
NOT Compliant

03 Unload (Harbor)

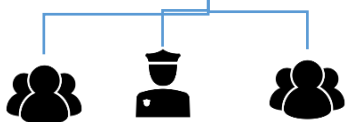
Logistics operator
Reads Token



Token + Additional info
Sent to Blockchain



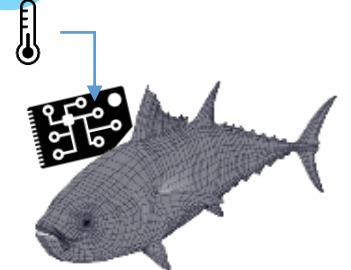
BLOCKCHAIN



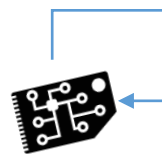
Blockchain nodes access
info:

- Authority / regulator
- Potential buyers
- Other logistics agents

04 Land transportation

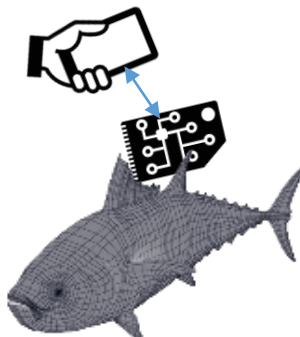


If temperature above legal
limit, token is changed:

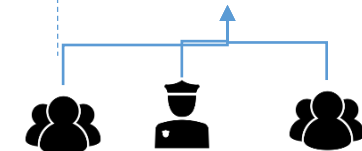


Change status to
NOT Compliant

05 Reception -at processing plant -at wholesaler



BLOCKCHAIN



Blockchain nodes access info
Life Cycle for this Tuna terminated