# The modular quantum computer

# How standards support the Dutch eco-system



### **Aims**

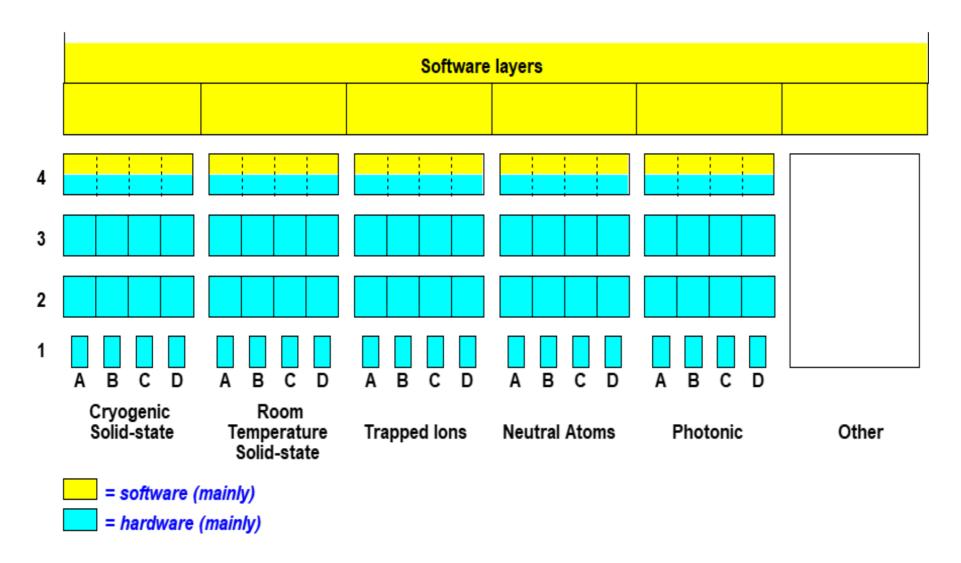
- A supply chain of various modules
- Mature products from different vendors (hardware and software)
- That can interwork with each other
- To build a quantum computer with modules
- Meeting requirements from customers (research institutes, system-integrators, ..)
- Strong position of the Dutch quantum industry



### Subdividing "Quantum Computing" into smaller chunks

Multiple hardware stacks

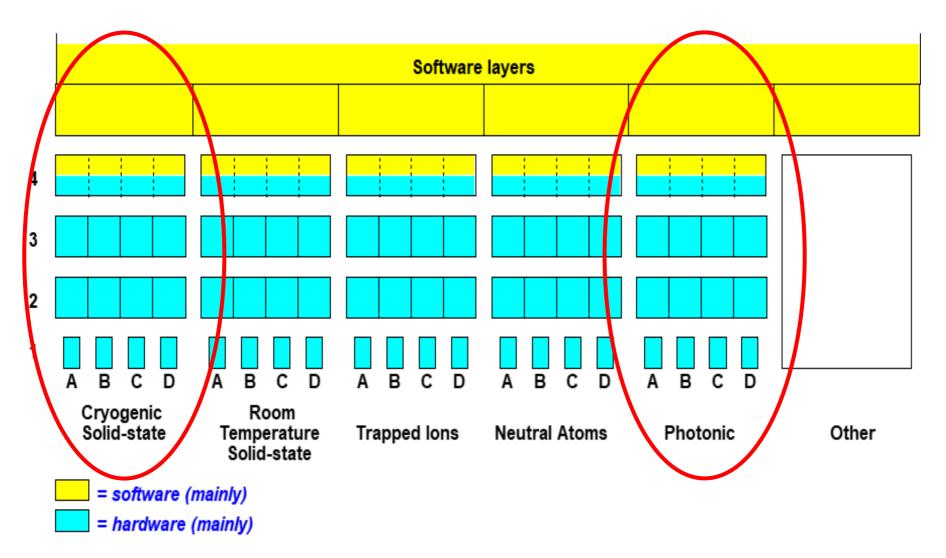
Multiple architecture families





## Subdividing "Quantum Computing" into smaller chunks

Multiple hardware stacks Multiple architecture families





#### Hardware stack, two examples

Multiple members per architecture family Multiple layers Control software 4 Control electronics 3 /optics **Control Highway** 2 **Quantum Devices** Cryogenic Solid-state **Photonic** 

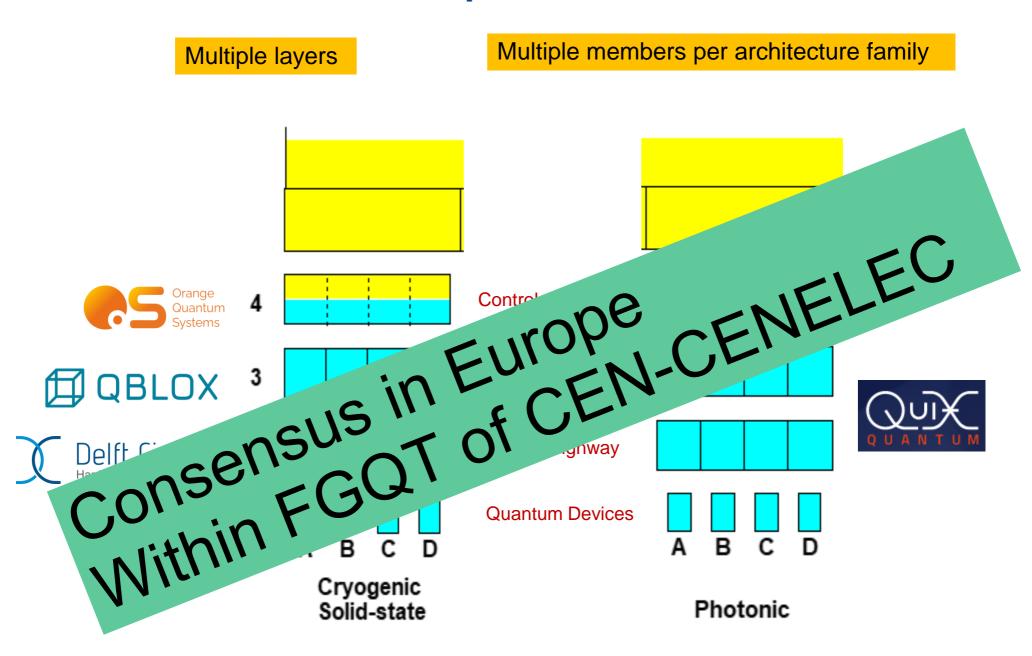


#### Hardware stack, two examples

Multiple members per architecture family Multiple layers Control software Control electronics **P**QBLOX /optics **Control Highway Quantum Devices** Cryogenic **Photonic** Solid-state



#### Hardware stack, two examples





#### **Software stack**

**Applications / Services supporting use cases Programming layers** Assembly / register level programming **Hardware abstraction layer Software drivers Operating system communication primitives Control software** 

Currently under study, within CEN-CENELEC



# **Next steps**

- Functional description of modules
- Functional requirements of modules
- Strong involvement of Dutch stake holders
- Shape the quantum future, (to support Dutch interest)



