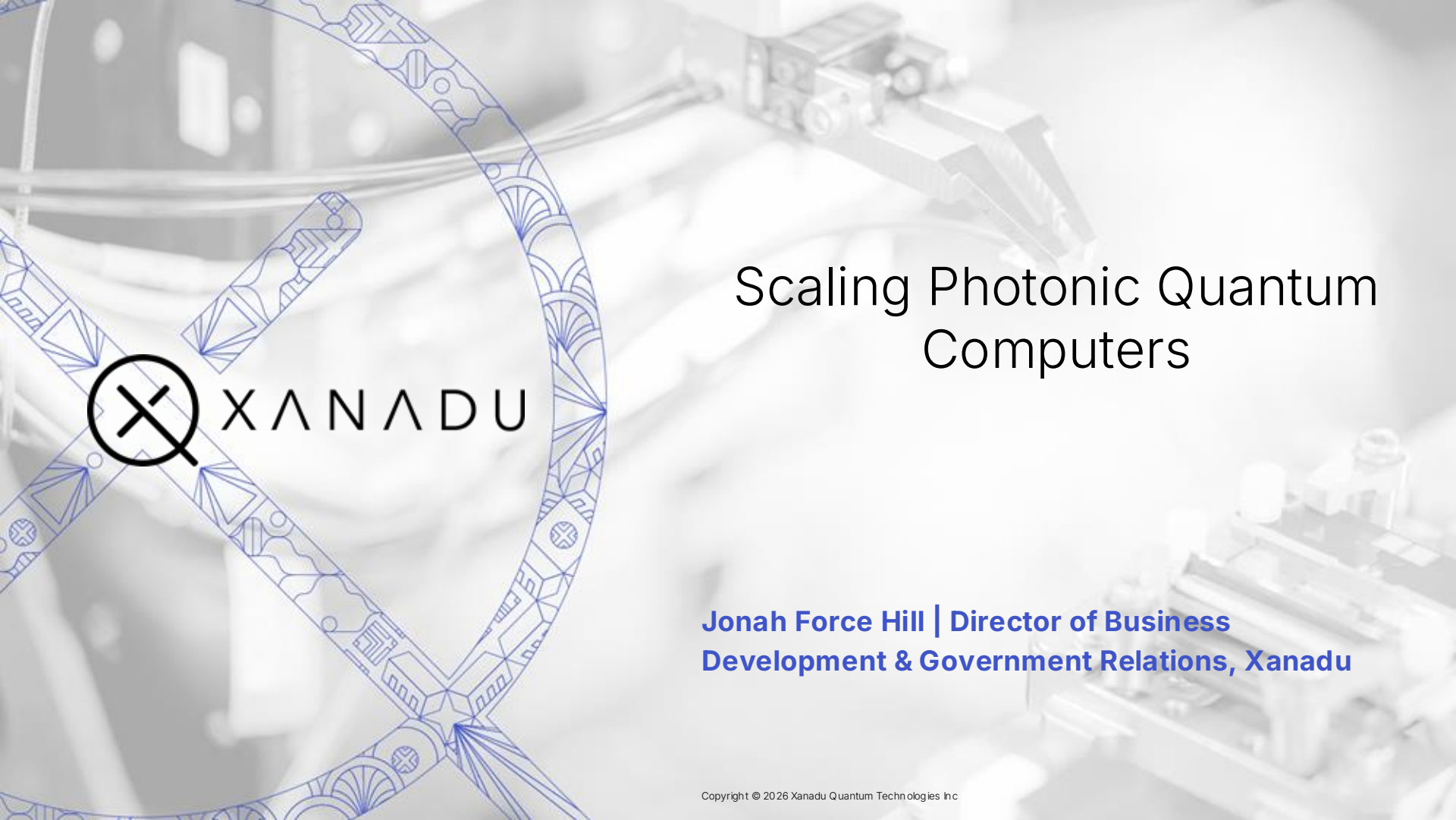


Scaling Photonic Quantum Computers

Jonah Force Hill | Director of Business Development & Government Relations, Xanadu

Copyright © 2026 Xanadu Quantum Technologies Inc

OUR MISSION

To build quantum computers that are **useful** and **available to people everywhere**

Founded
2016

Headquarters
Toronto

People
380+



Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

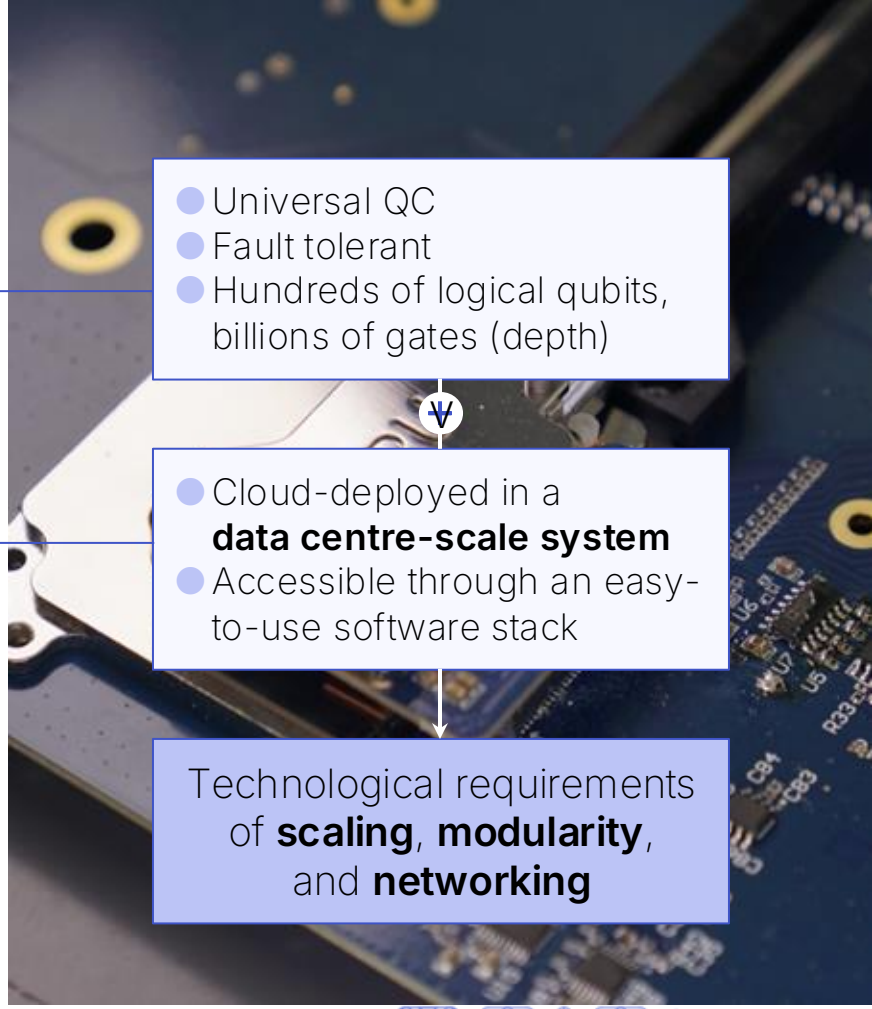
OUR MISSION

To build quantum computers that are **useful** and **available to people everywhere**

Founded
2016

Headquarters
Toronto

People
380+



- Universal QC
- Fault tolerant
- Hundreds of logical qubits, billions of gates (depth)

- Cloud-deployed in a **data centre-scale system**
- Accessible through an easy-to-use software stack

Technological requirements of **scaling**, **modularity**, and **networking**

Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

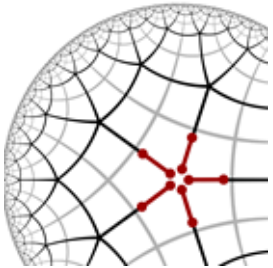
Advantages of photonic quantum computing



No cooling required for computation



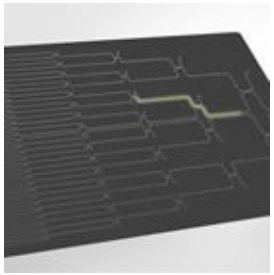
Manufacturable using silicon processes



Error correction flexibility



Modular and networkable



Faster clock speeds



Compatible with telecom

Copyright © 2026 Xanadu Quantum Technologies Inc.

Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

A brief history of Xanadu **hardware demonstrations**

While developing the architectural blueprint for GKP-based photonic quantum computing, it became clear that a number of crucial hardware primitives had not yet been demonstrated.

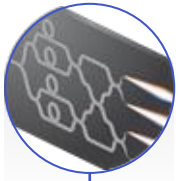
To motivate R&D progress and de-risk the functionality of these primitives, several significant experiments and systems demonstrations were carried out during 2018-2025.



2018

QUADRATURE-SQUEEZED VACUUM from a silicon Nitride PIC (two-mode, nondegenerate).

Published in Science Advances (2020)



2019

GAUSSIAN BOSON SAMPLING 8 mode Programmable device cloud-deployed for customer access.

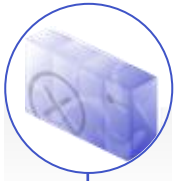
Published in Nature (2021)



2020

SINGLE-MODE, DEGENERATE SQUEEZING from a silicon nitride photonic molecule.

Published in Nature Communications (2021)



2021

QUANTUM COMPUTATIONAL ADVANTAGE using stabilized fiber delay lines for time encoding.

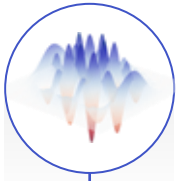
Published in Nature (2022)



2023/4

COMPLETE 12-QUBIT MODEL of FTCQ blueprint constructed demonstrating scalability, modularity, networking, and systems integration.

Published in Nature (2025)

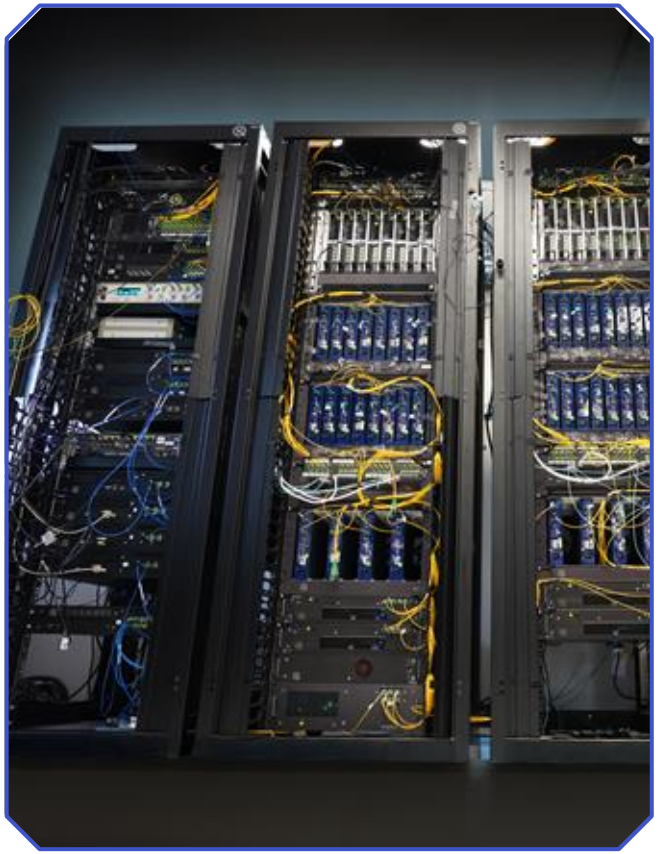


2024/5

GKP QUBIT DEMONSTRATED with 3x3 negative Wigner function grid and 4 peaks in both quadratures

Published in Nature (2025)

Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

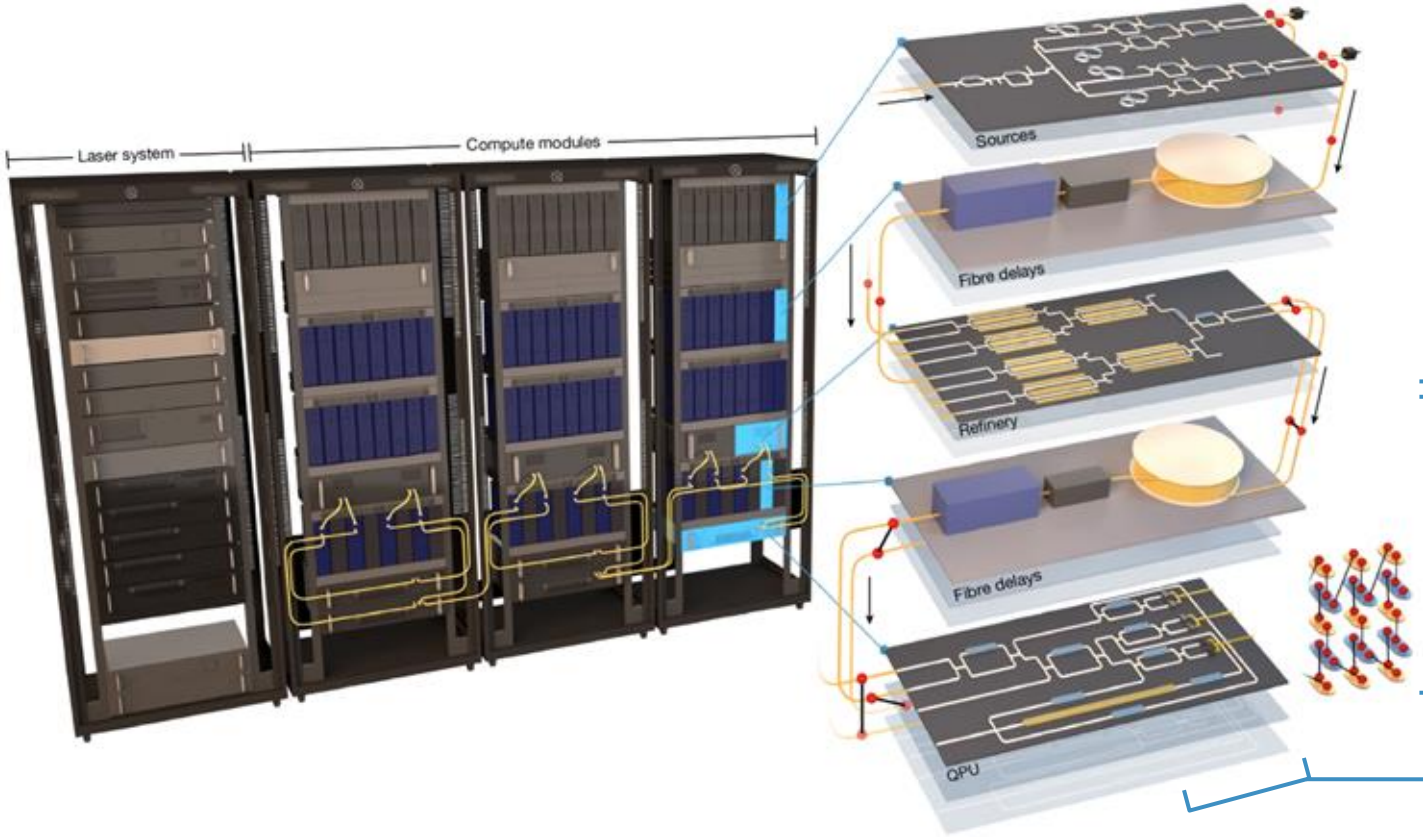


Aurora was the outcome of operation: “Feel The Burn”

- **World’s first** full implementation of all subsystems needed for universal quantum computation
- **First** modular, scalable, and networked quantum computer
- **35 integrated** photonic chips, 3 different substrates, 12 physical qubits with over 86 billion modes
- **Demonstrated** for first time real-time error correction decoding algorithm with photonics
- **Achieved** 30X loss reduction and 100X hardware overhead reduction

Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

Aurora: full architecture prototype



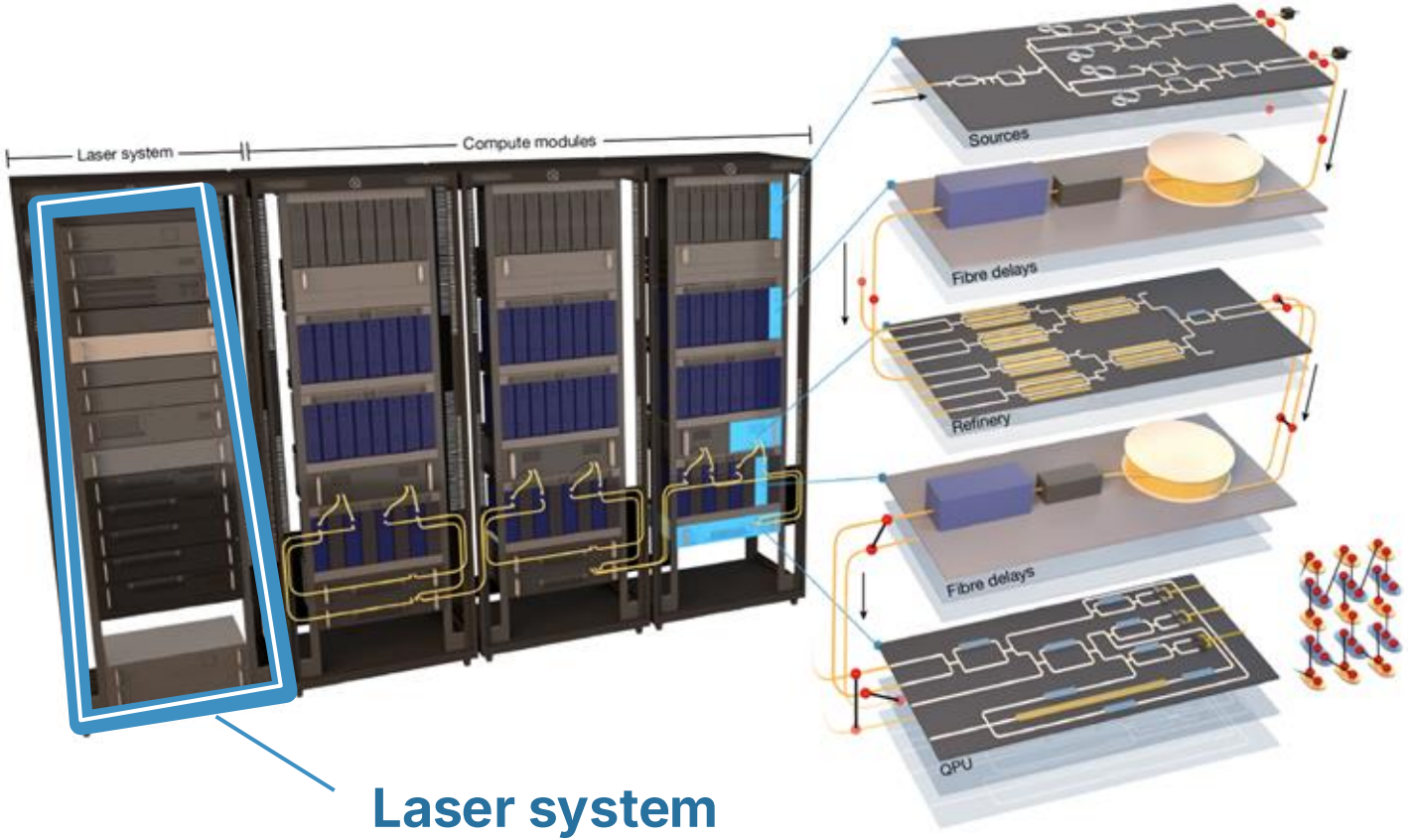
Make qubits
(Single-mode GKP states in pulses of light)

Entangle qubits
(Create a 3D spatio-temporal cluster state)

Do gates
(Measurement-based gates using homodyne detectors)

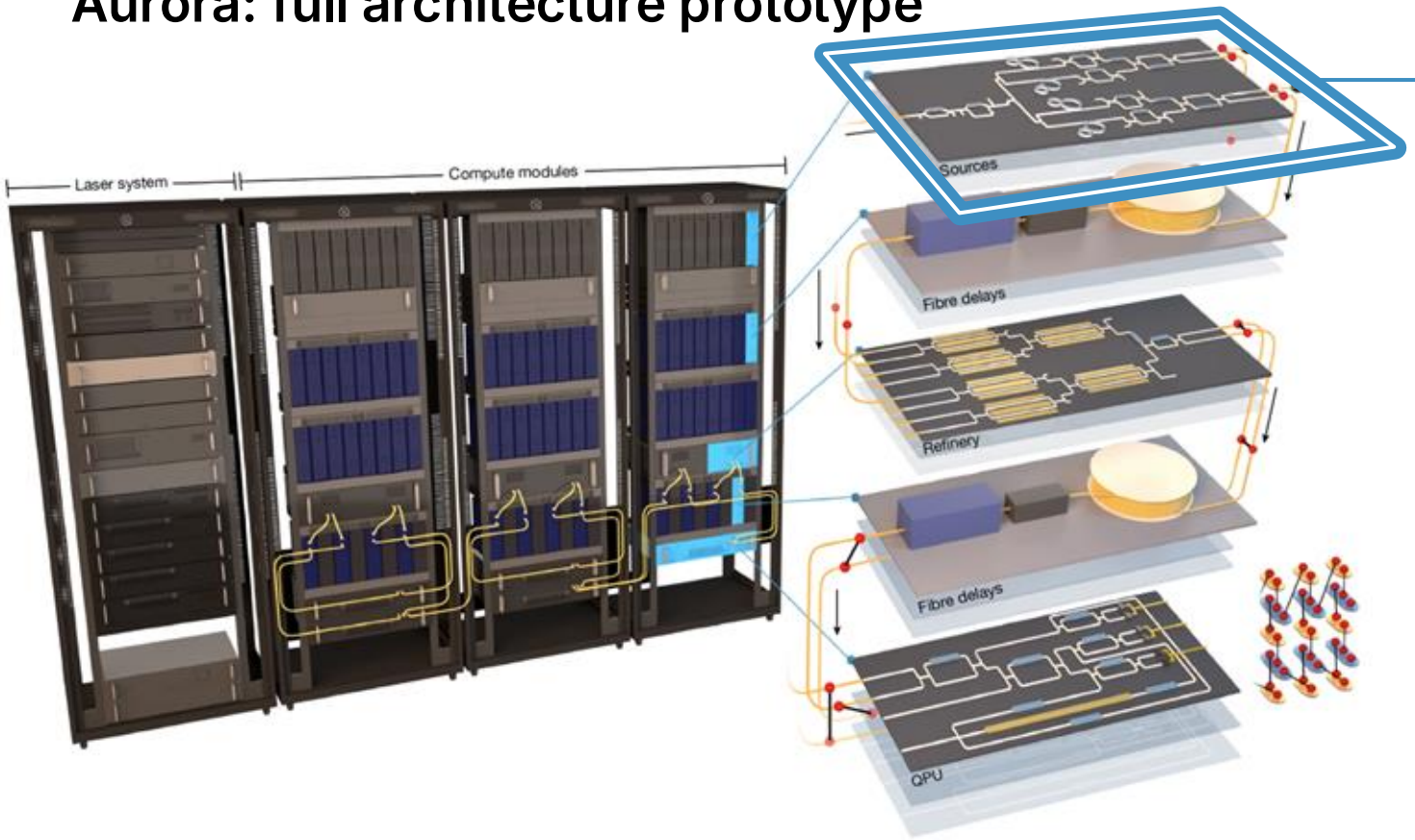
Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

Aurora: full architecture prototype



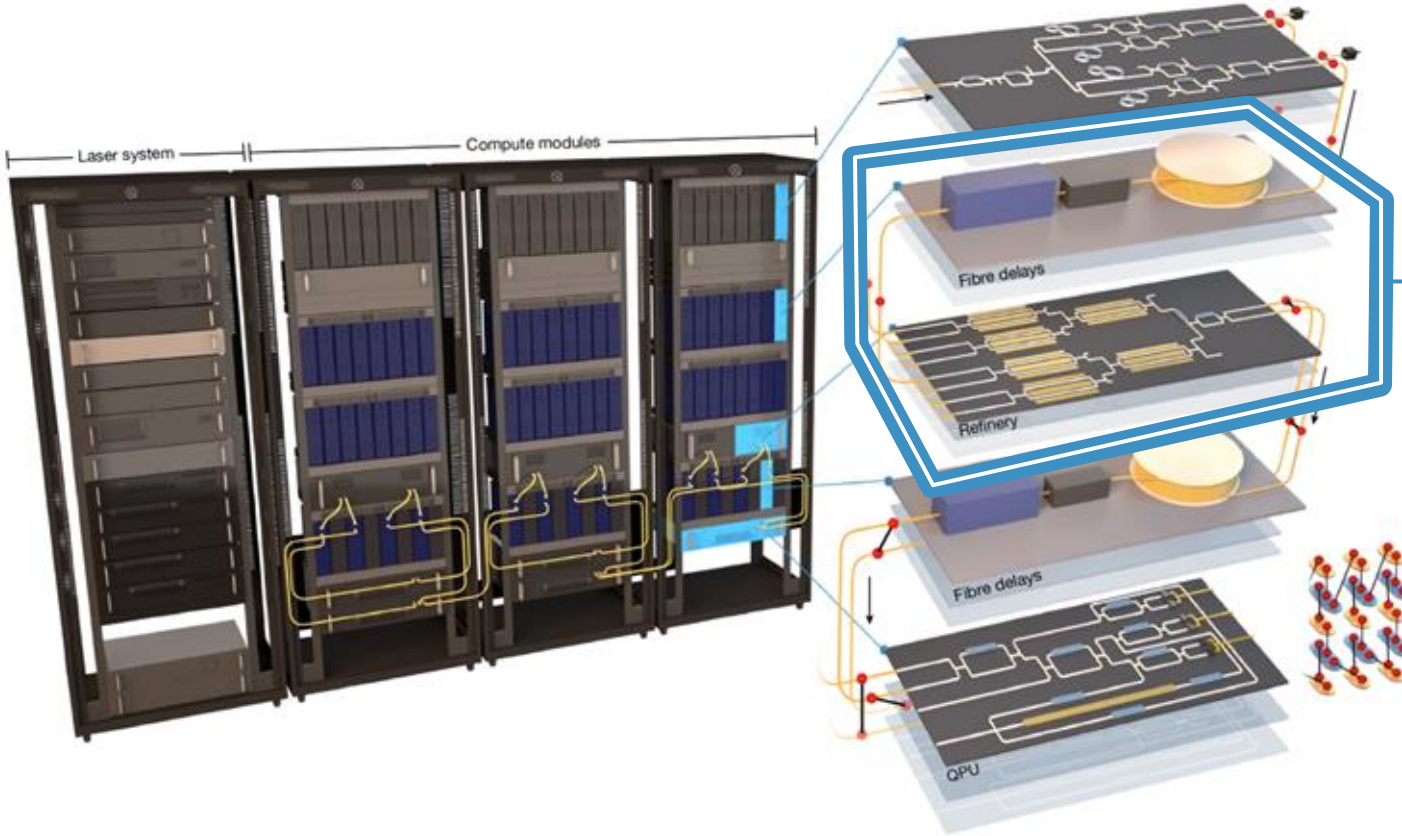
Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

Aurora: full architecture prototype



Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

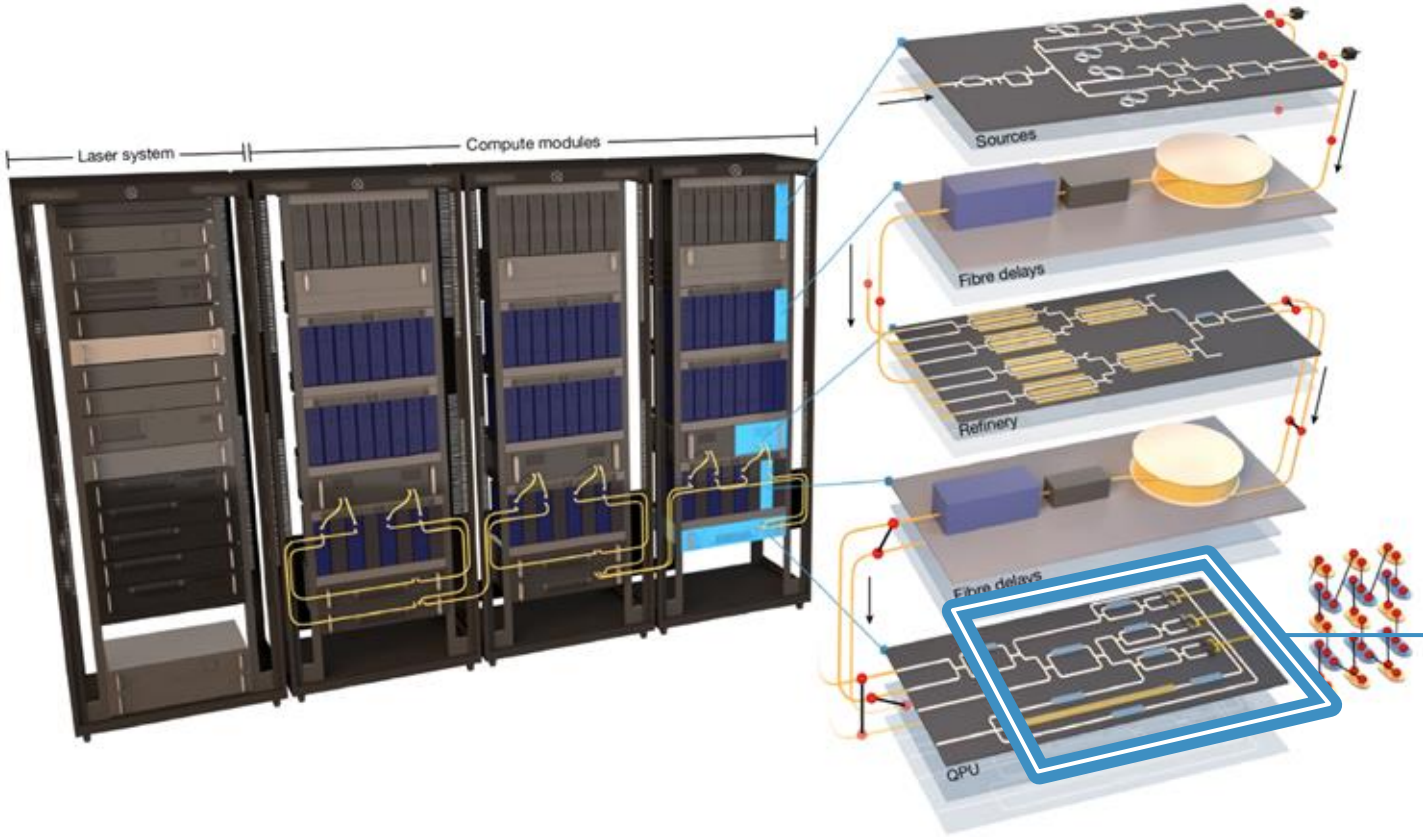
Aurora: full architecture prototype



Multiplexing

Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

Aurora: full architecture prototype



Gates with realtime feed-forward

Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.

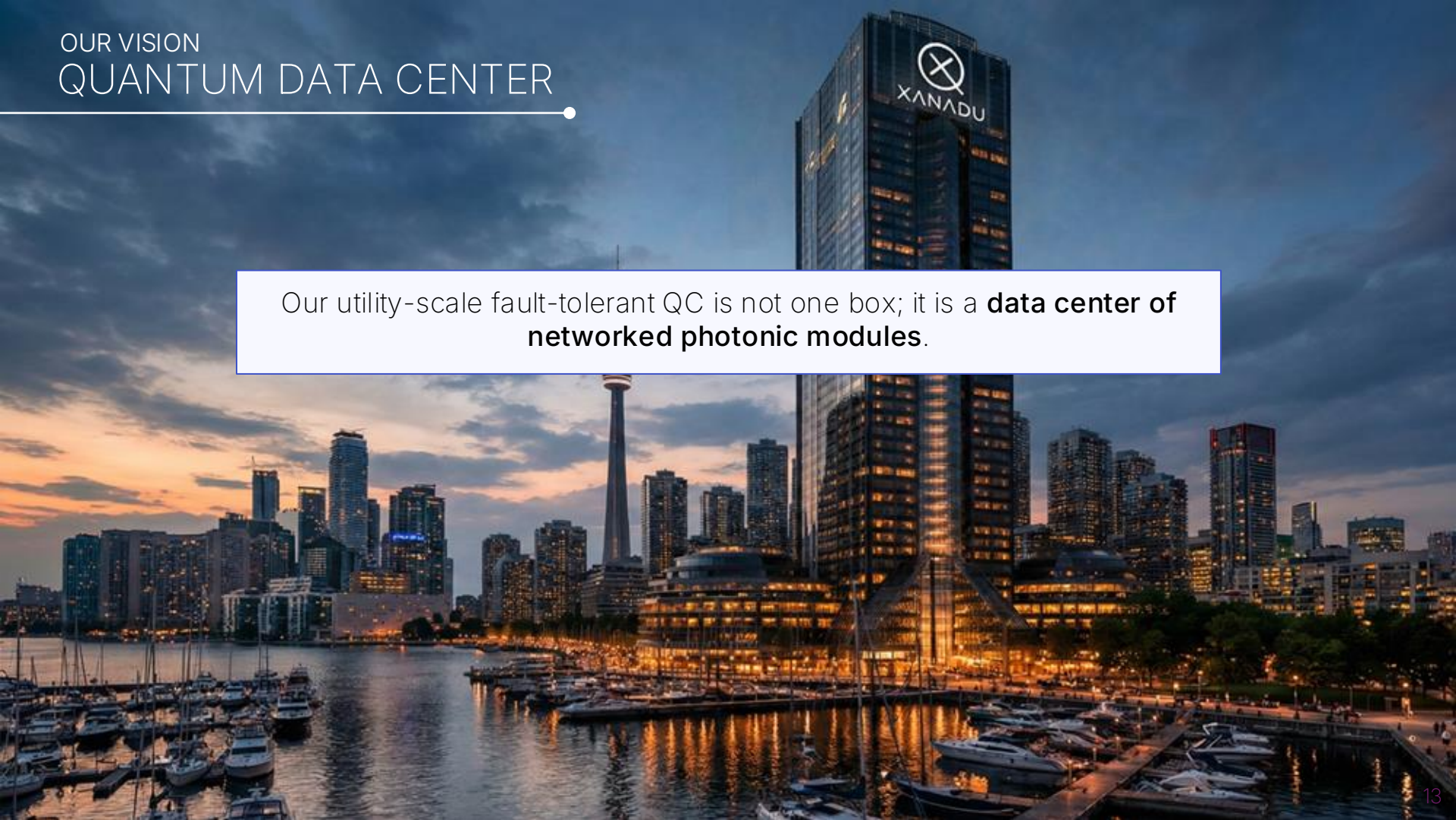
OUR VISION

QUANTUM DATA CENTER



OUR VISION

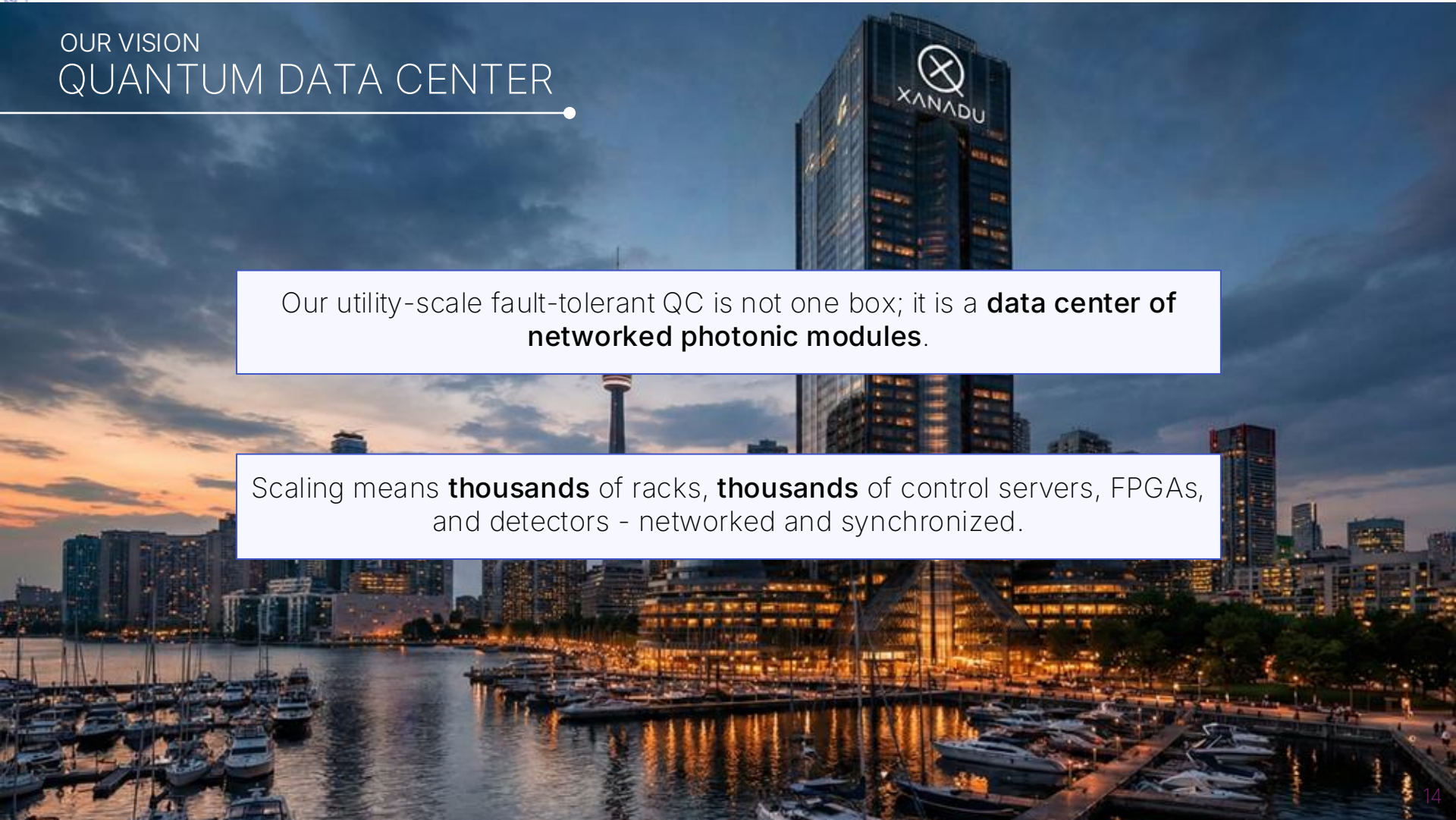
QUANTUM DATA CENTER



Our utility-scale fault-tolerant QC is not one box; it is a **data center of networked photonic modules**.

OUR VISION

QUANTUM DATA CENTER



Our utility-scale fault-tolerant QC is not one box; it is a **data center of networked photonic modules**.

Scaling means **thousands** of racks, **thousands** of control servers, FPGAs, and detectors - networked and synchronized.

HARDWARE ROADMAP

The visual path to large-scale fault tolerance, showing loss, physical qubit growth, error suppression, and manufacturing timeline milestones.

KEY TECHNICAL INDICATOR	2026	2027	2028	2029	2030	2031
Loss	24.1	10.2	7.2	1.8	1.0	1.0
Logical Error Rate				10^{-3} - 10^{-8}	10^{-16}	Less than 10^{-16}
Logical Qubits				Up to 200	Up to 500	1000+

	2026	2027	2028	2029	2030	2031

Technical Projects



Qubit Factory Built
Target: 2026 - 2027



Fault Tolerance
Target: 2028 - 2029



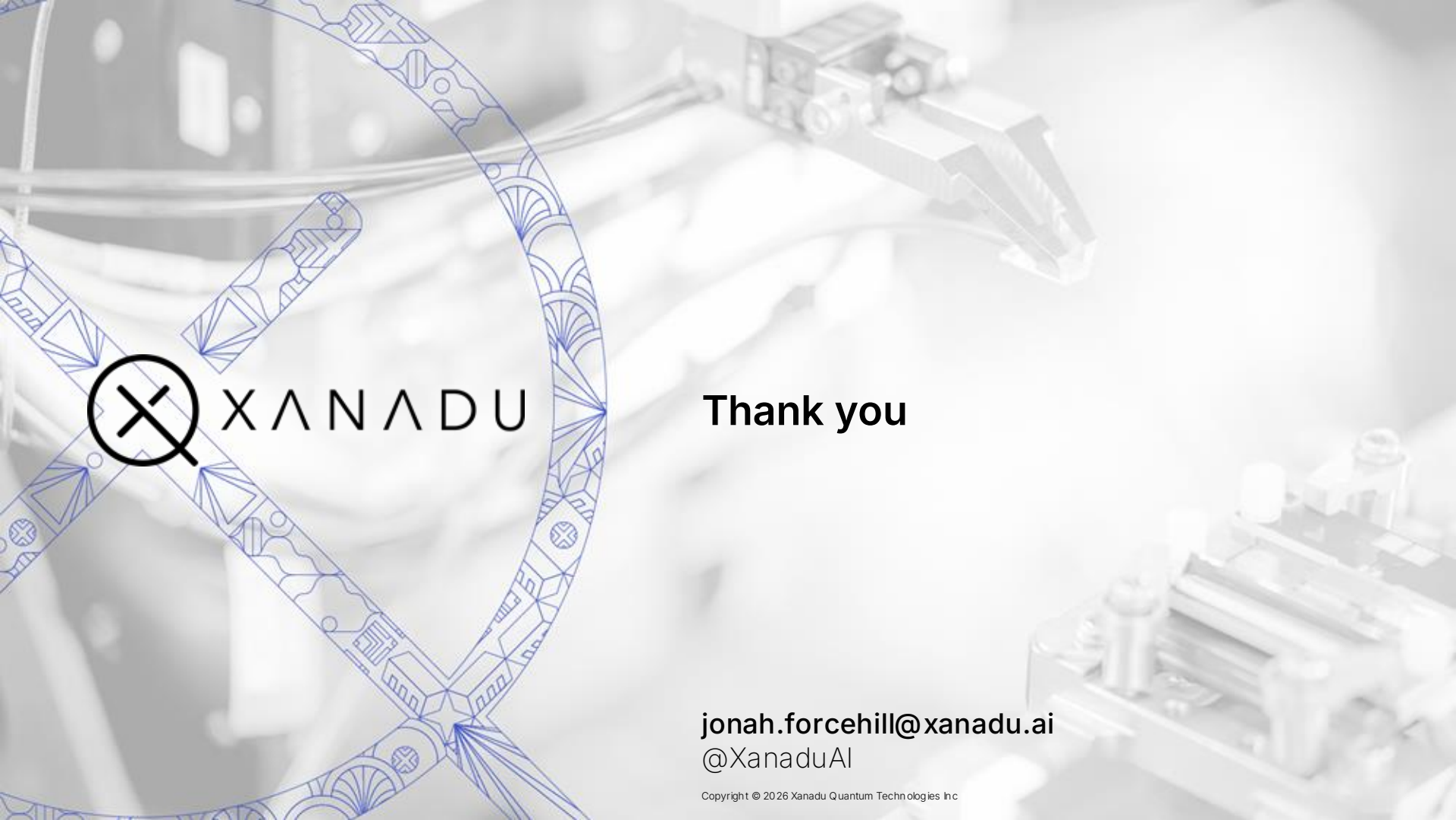
Quantum Data Center Operational
Target: 2029 - 2030

Facilities

Inception: Photonics Manufacturing & Integration

Building Quantum Data Center

Copyright © 2026 Xanadu Quantum Technologies Inc.
Certain information in this presentation relates to research, prototypes, or experimental results. These results are preliminary, subject to ongoing validation, and may not reflect future commercial performance.



Thank you

jonah.forcehill@xanadu.ai
@XanaduAI

Copyright © 2026 Xanadu Quantum Technologies Inc