MAINE DIGITAL GOVERNMENT SUMMIT

What's Next, What's Now

Frontier AI and Quantum Readiness

Opportunities ahead and the practical steps to capture them

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THE VIEW FROM INSIDE

Three Quantum Labs, Three Perspectives

Hands-on visits with research, enterprise, and academic quantum teams



Barcelona Supercomputing Center

Spain - National supercomputing facility
Quantum integration with MareNostrum

bsc.es



IBM Thomas J. Watson Research Center

Yorktown Heights, NY - IBM Think Lab
Superconducting qubit research

research.ibm.com/labs/yorktown-heights



Rensselaer Polytechnic Institute

Troy, NY - Academic quantum computing
Future of Computing Institute (FOCI)

foci.rpi.edu/computing-resources

Why this matters: every prediction in this deck comes from practitioners building, deploying, and integrating quantum systems today.

AGENDA

What we'll cover in the next 20 minutes

01



WHAT'S HAPPENING NOW

Two revolutions arriving at the same moment and what each one unlocks

~4 min

02



WHAT'S COMING NEXT

Frontier AI and Quantum opportunities for state government

~10 min

03



HOW TO PREPARE

Three concrete actions you can take this quarter

~4 min + Q&A

The Twin Revolutions - Two Different Clocks

GenAI and quantum are arriving together - but they move on different timelines and unlock different opportunities.

Frontier AI

Months, not years

Capability doubles every 3–6 months

- AI assistants handling citizen inquiries 24/7
- Document processing and translation automated
- Cyber threats vs cyber response
- New workforce productivity gains monthly

Quantum

Years to decades

Cryptanalytic potential ~2030–2035

- New cryptographic standards maturing
- Materials and drug discovery acceleration
- Optimization potential for routing and grids
- Hybrid classical + quantum workflows by early 2030s

AI as Your Force Multiplier

GenAI unlocks capabilities that were out of reach for lean government teams - when adopted thoughtfully.

OPPORTUNITIES

- Citizen service at the speed of conversation - AI assistants handling routine inquiries 24/7
- Real-time translation and accessibility for every state service
- Document processing, summarization, and compliance review automated
- Hybrid Agentic AI workflow strategy - combining open-weight and frontier AI models
- Workforce productivity gains - employees gets an AI co-pilot

DESIGN FOR SUCCESS

- Build with observability - log AI usage
- Plan for bias from day one - test models before deployment, monitor continuously
- Set cost controls - per-user caps, token spend limits, anomaly alerts
- Keep humans at the helm - especially for any decision affecting benefits
- Require accountability policy - who owns each agent, who is the principal

WHAT'S HAPPENING NOW

Designing AI for Fairness

When AI screens applications, fairness is a design choice and it can be measured, tested, and improved.

67–82%

self-preference bias across major commercial and open-source LLMs

23–60%

shortlist advantage when applicant and evaluator use the same LLM

>50%

of the bias can be removed with simple self-recognition interventions

What good design looks like:

- Test for self-preference bias before deploying any model in benefits eligibility
- Require human-in-the-loop review for any decision affecting benefits or rights
- Audit your models quarterly or more frequently. Bias can drift as models are retrained and new data is introduced into RAG models
- Leverage multi-model architecture for automated auditing
- Build a clear appeals path so citizens can challenge AI-influenced decisions

SOURCE

arxiv.org/abs/2509.00462 - Self-Preference Bias in LLM-Assisted Hiring Decisions

Five Quantum Opportunities for State & Local Government

Use cases where quantum should excel - quantum-inspired algorithms - unlock meaningful value for the public sector.

01

TRANSPORTATION & LOGISTICS

Routing snowplows, school buses, paratransit, and emergency vehicles across a state is a complex problem that grows explosively with scale. Quantum optimization approaches could find better solutions cutting fuel costs and response times.

02

ENERGY GRID & INFRASTRUCTURE

Balancing renewable generation, storage, and demand across a statewide grid is a massive optimization problem. Quantum algorithms could improve load forecasting, power flow optimization, and siting decisions for transmission and charging infrastructure.

03

CLIMATE, WEATHER & DISASTER MODELING

Flood, wildfire, and coastal storm modeling involve complex simulations that strain classical supercomputers. Quantum may eventually speed up parts of these including fluid dynamics and materials simulation helping emergency management agencies with better risk maps, resilience planning, and citizen emergency notifications.

04

PUBLIC HEALTH & MATERIALS RESEARCH

Quantum computers are naturally suited to simulating molecules accelerating drug discovery and new materials development. For states, the benefits show up through public health agencies, state university research systems, and life-sciences economic development. DOT and materials manufacturers accelerated testing of materials such as pavement, concrete, and steel.

05

CRYPTOGRAPHY & DATA PROTECTION

Quantum key distribution and the new NIST post-quantum standards together give you the tools to protect citizen data for the next generation. The practical work now is inventorying cryptographic dependencies, migrating to NIST's post-quantum cryptography (PQC) standards, maturing data handling, and updating procurement language to require adherence to PQC standards.

Post-Quantum Cryptography (PQC): Your Real Quantum Priority

Before you can capture quantum's upside, you need to modernize the cryptographic foundation that protects citizen data. NIST's post-quantum standards are the path.

THE MODERNIZATION OPPORTUNITY

- NIST finalized the first post-quantum standards in 2024
- These algorithms run on your existing classical hardware - no quantum computer required
- They replace existing standards and PQC should be requirement for all new deployments
- PQC migration is being described as one of the largest security upgrade in government IT history - a multi-year modernization program
- The work you do now protects citizen data for years to come

FIVE-ASSET READINESS CHECKLIST TO GET STARTED

01 WEB BROWSERS

02 DIGITAL CERTIFICATES

03 CERTIFICATE AUTHORITIES

04 DNS PROVIDERS

05 SECURITY HARDWARE & SOFTWARE

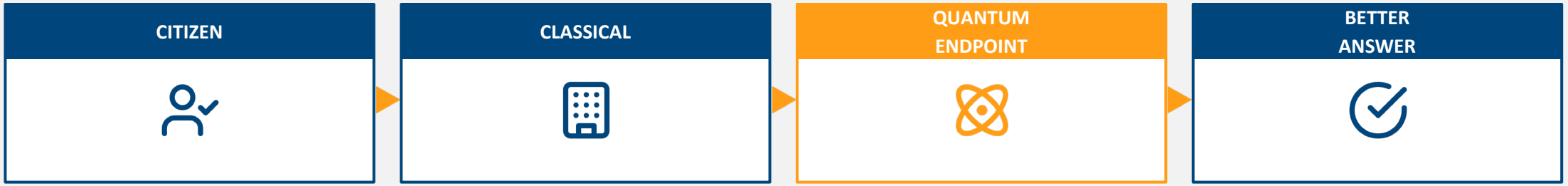
The Timeline Reality - and the Hybrid Future

Practitioners estimate 3–10 years for useful application-layer quantum. Plan for the middle. Build for the hybrid world.

What quantum practitioners expect



THE HYBRID FUTURE - You don’t need to buy a quantum computer. You use it.



When Personal AI Agents Visit Your State Website

Personal AI agents are coming fast. Within 3 years, a meaningful share of traffic to state websites will come from citizens' agents, not citizens themselves.



OPTION A

VERIFY

Build identity systems that recognize and validate personal AI agents acting on behalf of citizens.

Most flexible. New identity standards, potential new legal and privacy frameworks for delegated authority.



OPTION B

AUTHENTICATE

Require humans to authenticate every agent action through existing identity systems - friction by design.

Works short-term. Suboptimal user experience and breaks at scale.



OPTION C

PROVIDE

Provide each citizen with a state-issued personal AI agent via a single citizen identity platform.

Most ambitious. Highest trust, highest control, long-term play.

Three Things to Do This Quarter

ACTION 01

01

INVENTORY

Build your cryptographic asset inventory

Certificates, CAs, browsers, WAFs, load balancers, firewalls, VPNs, DNS providers, highly sensitive data. You cannot secure and modernize if you don't know what you have.

ACTION 02

02

PILOT

Build an Agentic AI Software Workflow

Create a controlled AI development team: open-weight model junior developer, frontier-model senior developer, product owner agent, and human oversight. Give this "team" one application to build and measure speed, cost, quality, security, and human intervention.

ACTION 03

03

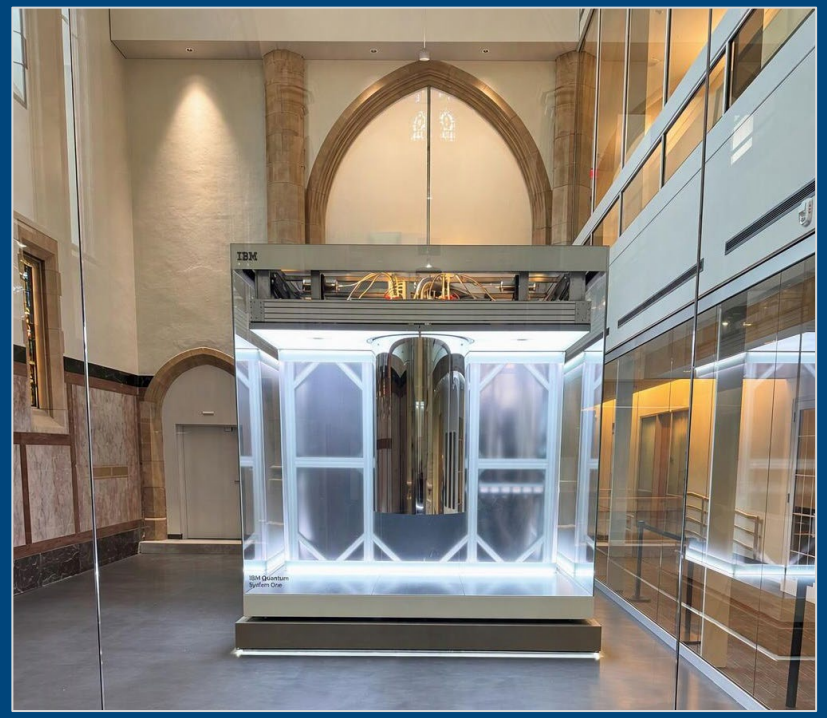
CONVENE

Quantum Working Group

Form a cross-functional Quantum Working Group:

Enterprise Architecture, Security Office, Data Office, IT Operations, Procurement / Contract Management, Legal, Agency Business Leads, Industry Advisors.

QUESTIONS? **Thank you.**





Thank you

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Maine Digital Government Summit