CICI: UCSS: Programmable Wireless Infrastructure with Formal Assurance for Cross-Campus Research

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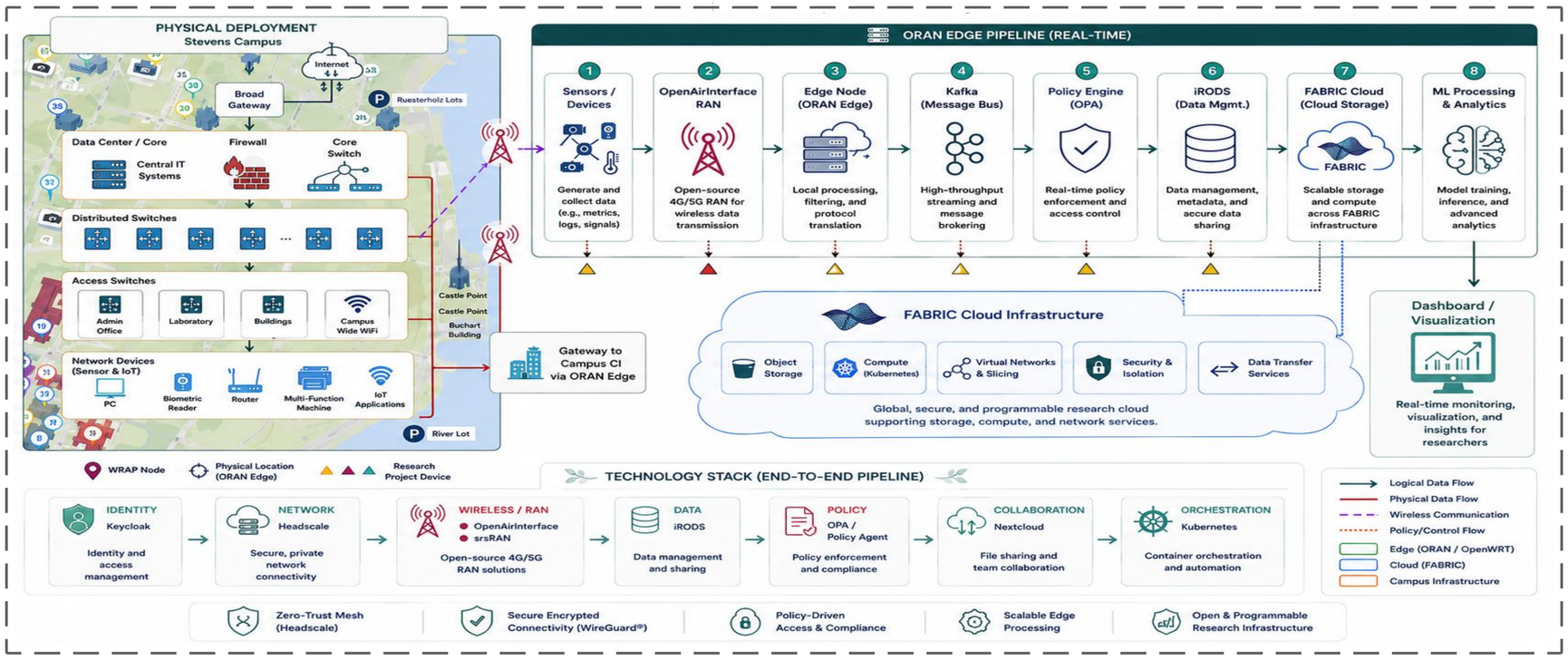

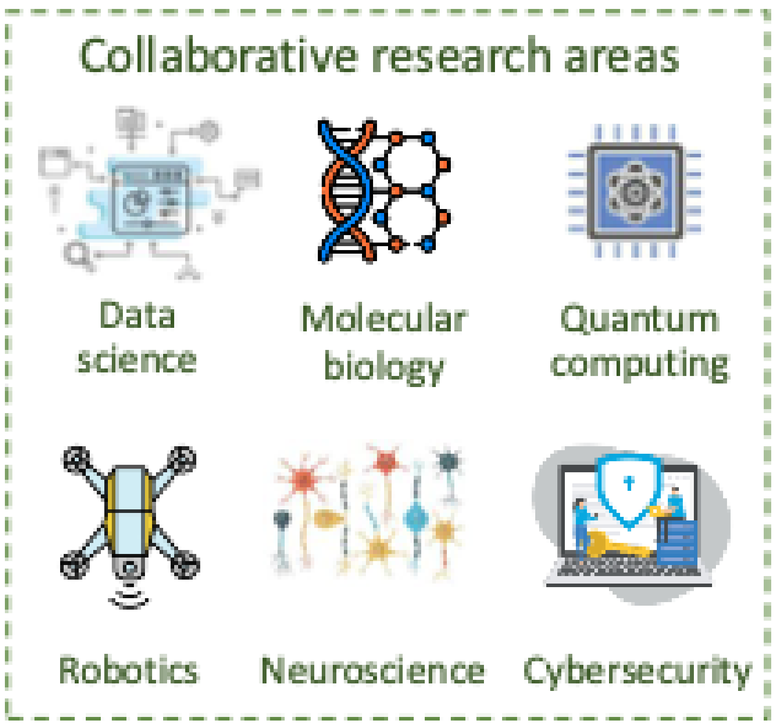

Implementation & Evaluation:
- Stevens and Fordham IT network pilot implementation and integration
- Digital twin–based wireless CI testbed
- Joint policy assurance and federated access for research workflows
- Usability evaluation via researcher engagement

Thrust 1: Programmable Wireless Enclaves

- VLAN segmentation & access control
- Cross-campus wireless overlay

Thrust 2: Formal Assurance & Fuzzing

- Formal policy verification
- Runtime anomaly detection

Thrust 3: Usability-Centered Security Design

- Researcher-facing interfaces
- Federated access configurator

Collaboration and Usability Challenge Addressed

Collaborative research requires dynamic cross-campus wireless access, but the state of practice security approaches limit flexibility.

WRAP combines open program infrastructure with formal assurance to align usability and compliance. Researcher-facing tools simplify configuration while IT teams maintain visibility and control.

Technical Cybersecurity Solution

Formal assurance translates researcher goals into verifiable policies.

Runtime anomaly detection ensures continuous, secure operation.

Replicable architecture unites programmability, assurance, and usability.

Benefits to Scientific Cyberinfrastructure

- Enables secure, policy-compliant collaboration across campuses.
- Reduces friction between researcher agility and IT enforcement.
- Supports diverse workflows in genomics, AI, robotics, quantum, and more.
- Provides reusable open-source toolkits and training materials for adoption.

Result Dissemination Plans

- Open-source release of WRAP toolkits, policy models, and verification datasets.
- Deployment templates, dashboards, and training materials for replication at peer institutions.
- Publications, workshops, and cross-campus demos to engage both researchers and IT teams.

Risks Versus Potential For Advances

Risk: Unforeseen domain regulations, cross-campus policy conflicts, and stakeholder priorities may limit seamless adoption.

Payoff: Cross-domain researcher and IT engagement builds a replicable, evolving architecture with error resilience, sustainability, and scalability beyond campuses.