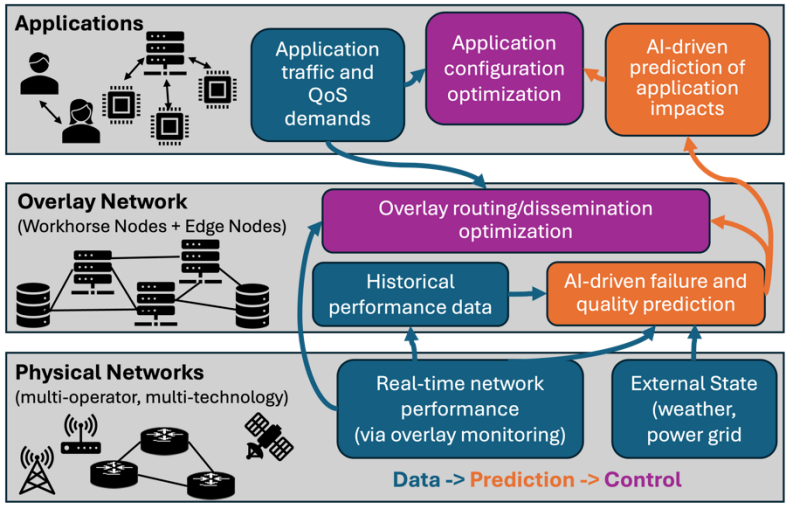
Track 1: VINES: Track 1: Intelligent Resilient Overlays for NextG Networks (IRONN) #2548922

Problem to Solve

Resilience strategies focusing on a single operator's network are not sufficient to maintain **uninterrupted real-time application service** (e.g. for power grid / water supply monitoring and control, robotic / vehicular control and coordination, VR / telepresence) **under large-scale regional outages** (e.g. natural disasters) and **frequent small-scale failures**. Solutions to leverage resources **across multiple network operators** and support **application reconfiguration** are needed.



Vector A

We will advance **Network Convergence (A5)** by seamlessly integrating resources from different types of networks to improve end-to-end **Network Resilience (A4)** for applications.

Vector B

We adopt an **AI-Native Design (B1)** to predict outages and jointly optimize network-level and application-level re-routing or reconfiguration strategies.

Convergence

We introduce an overlay platform to collect data from and implement AI-driven control decisions across multiple networks to improve end-to-end resilience.

Project Contributions

We will create an **intelligent overlay infrastructure** that enables AI-driven predictive routing and application reconfiguration across the user-to-edge-to-cloud continuum.

Your Approach

Thrust 1: Predict network failures and their overlay-level and application-level impacts
Thrust 2: Design predictive, underlay-aware overlay routing/dissemination protocols
Thrust 3: Design application reconfiguration strategies based on overlay-supplied network data and predictions

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