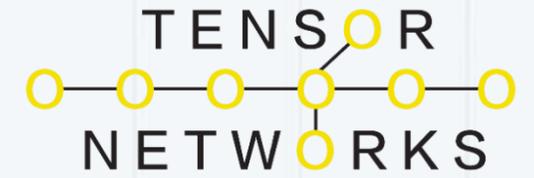


The Predictive Mobility Fabric

Solving the Autonomous Vehicle Data Bottleneck with PTCP



PTCP Orchestration: Predictive Mathematical Optimization

Legacy infrastructure: Reactive & Latency-Prone

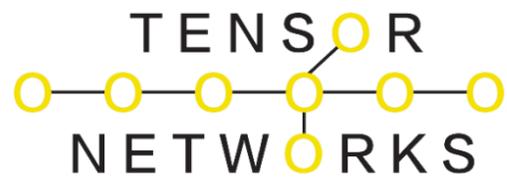
DATA CHOKEPOINT

$\Delta t_{\text{prep}} < 10\text{ms}$;
 $T_{\text{cel. Accuracy}} > 98.5\%$

PoL-TT Framework: Pattern-of-Life Tensor Learning

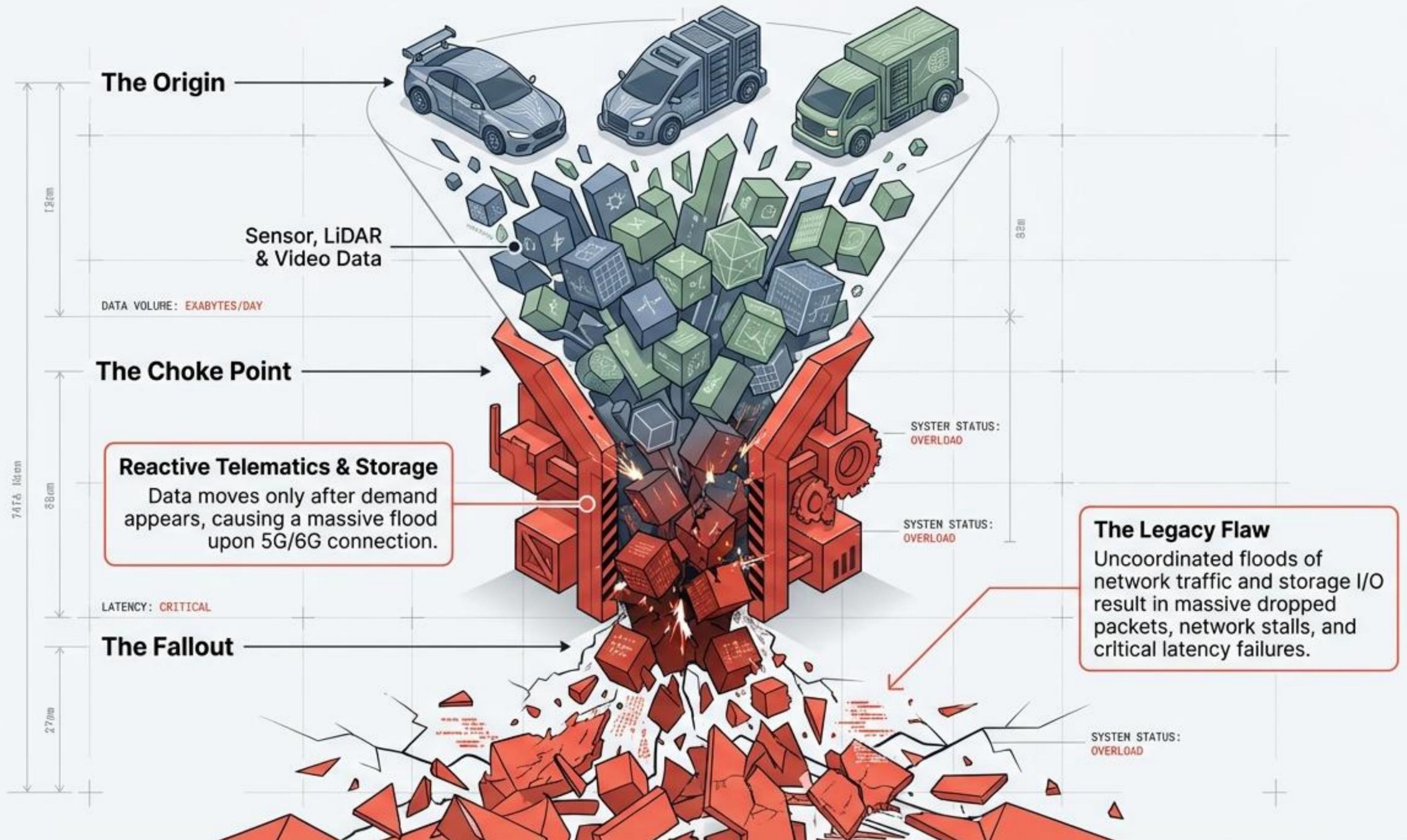
Legacy Infrastructure: Reactive & Latency-Prone

An architectural overview of the Predictive Tensor Control Plane (PTCP) and the Pattern-of-Life Tensor Train (PoL-TT) framework.

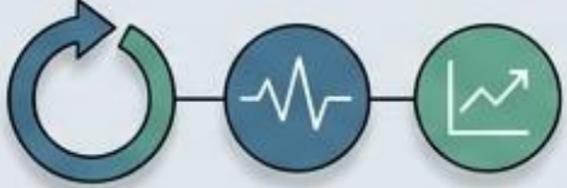
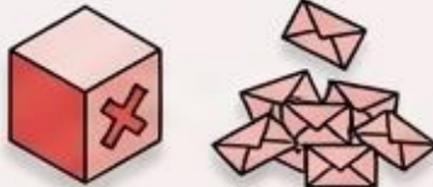
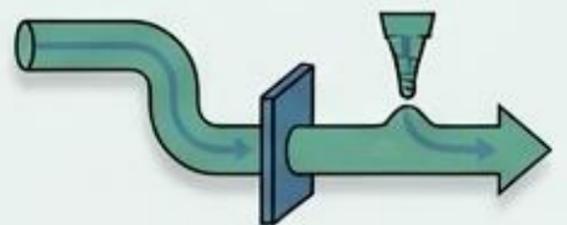
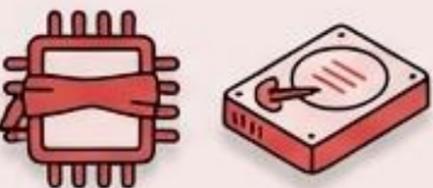
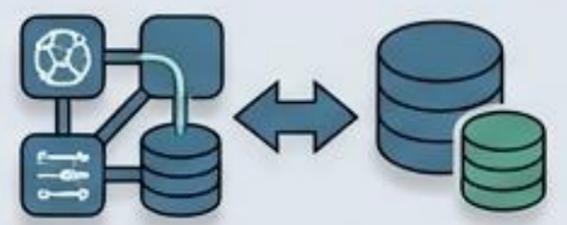
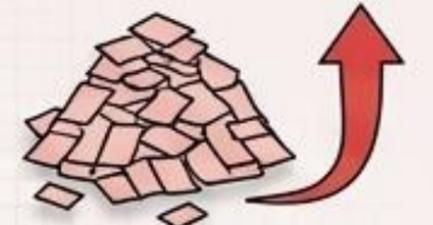
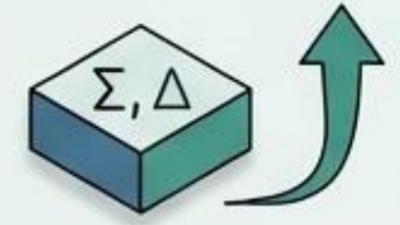


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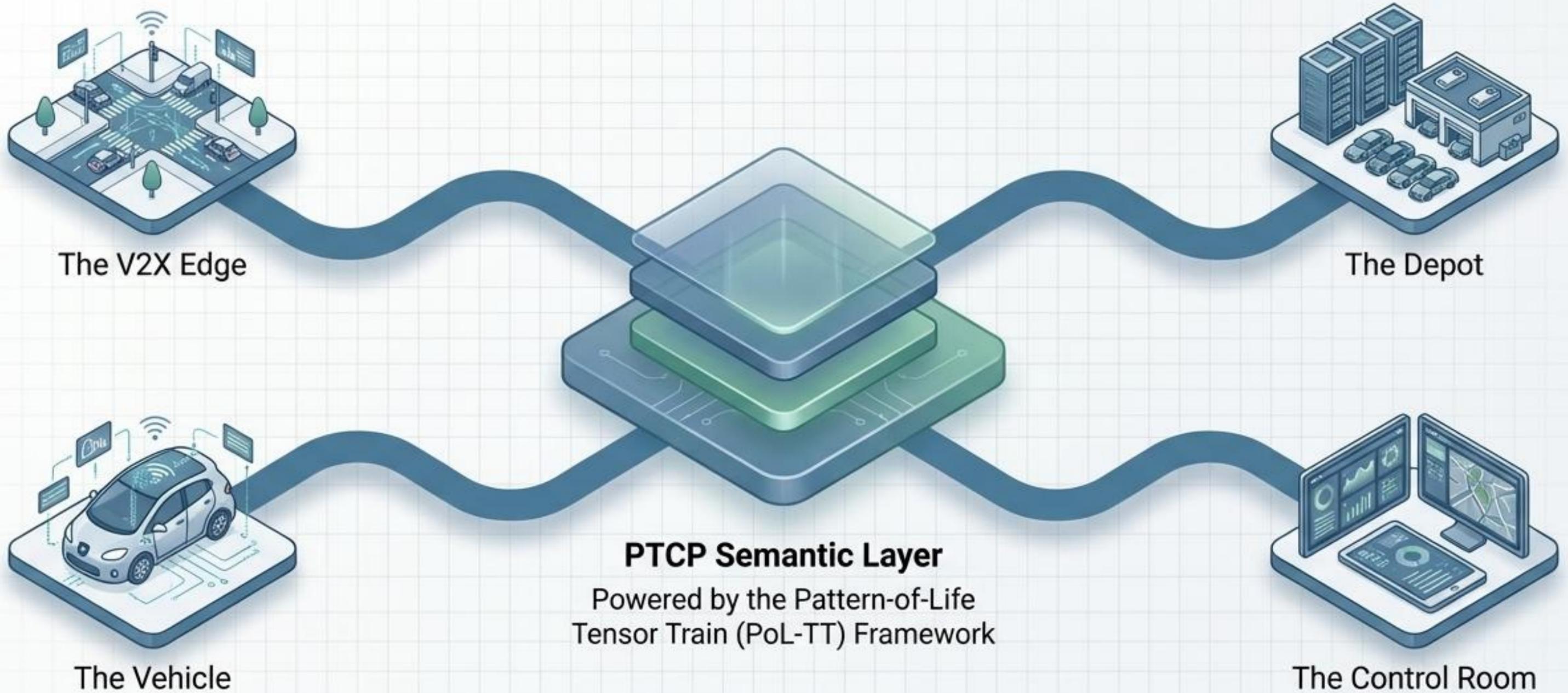
The AV Data Avalanche Breaks Reactive Infrastructure



Transitioning from Reaction to Forecasting

	Reactive Legacy Infrastructure	PTCP Predictive Fabric
Trigger	 <p>Demand-Driven Wait for the physical data flood.</p>	 <p>Forecast-Driven Anticipate via Pattern-of-Life modeling.</p>
Response	 <p>Packet Drop Buffer overflow at the edge switch.</p>	 <p>Pre-emptive Pacing Bound and route before the spike.</p>
Storage	 <p>Host-Blind CPU blindly writes data, causing PCIe stalls.</p>	 <p>Cross-Layer Sync Network and storage share one predictive model.</p>
Fleet Telemetry	 <p>Raw Data Exchange Petabyte-scale, financially unscalable uploads.</p>	 <p>Mathematical Summaries Compact marginals and tensor deltas.</p>

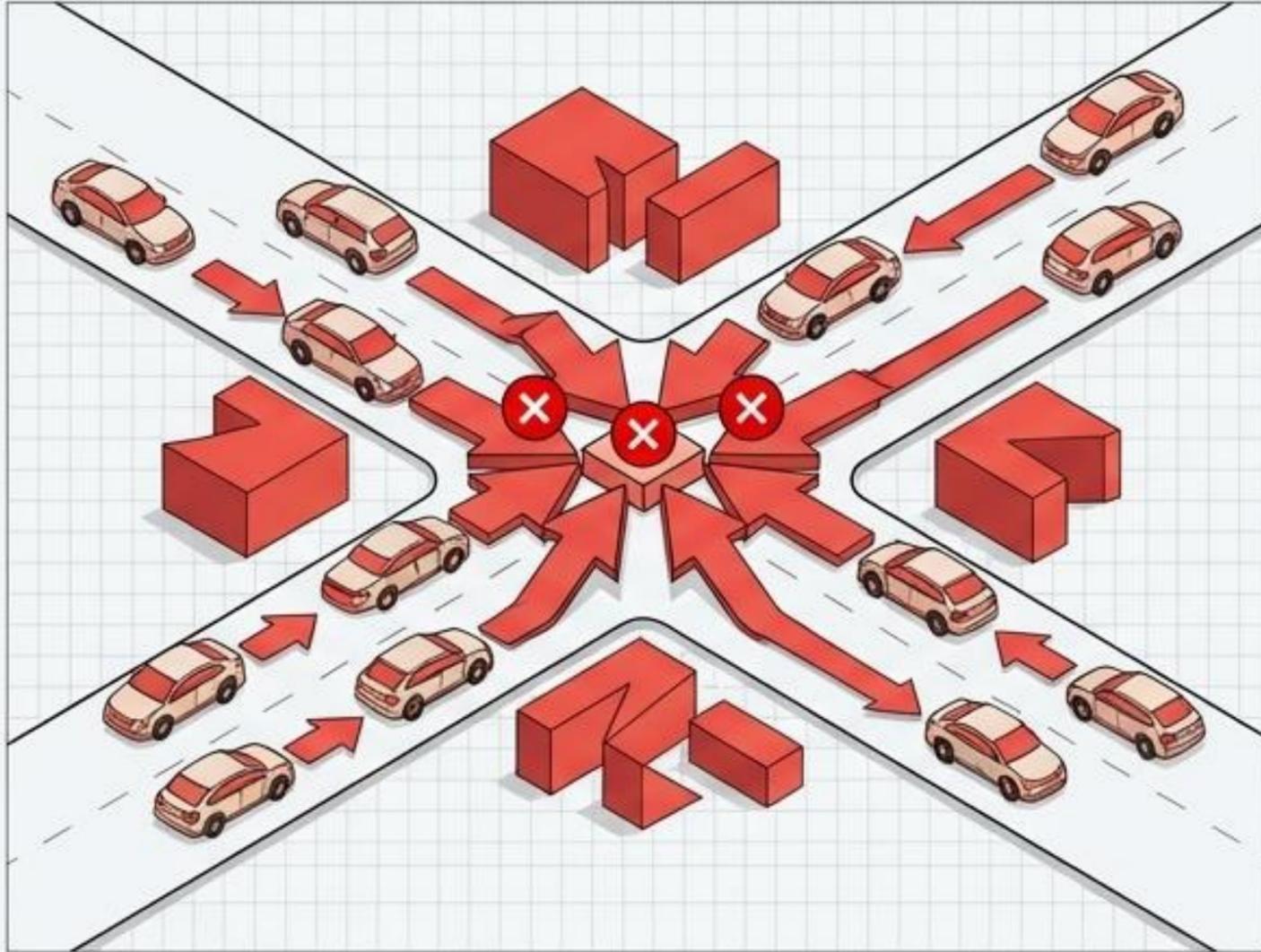
The Predictive Tensor Control Plane (PTCP)



The PTCP Advantage: Deployed across the mobility edge to transform massive, uncoordinated data avalanches into a synchronized, mathematically tractable pipeline.

The Intersection: Securing Sub-Millisecond V2X Latency

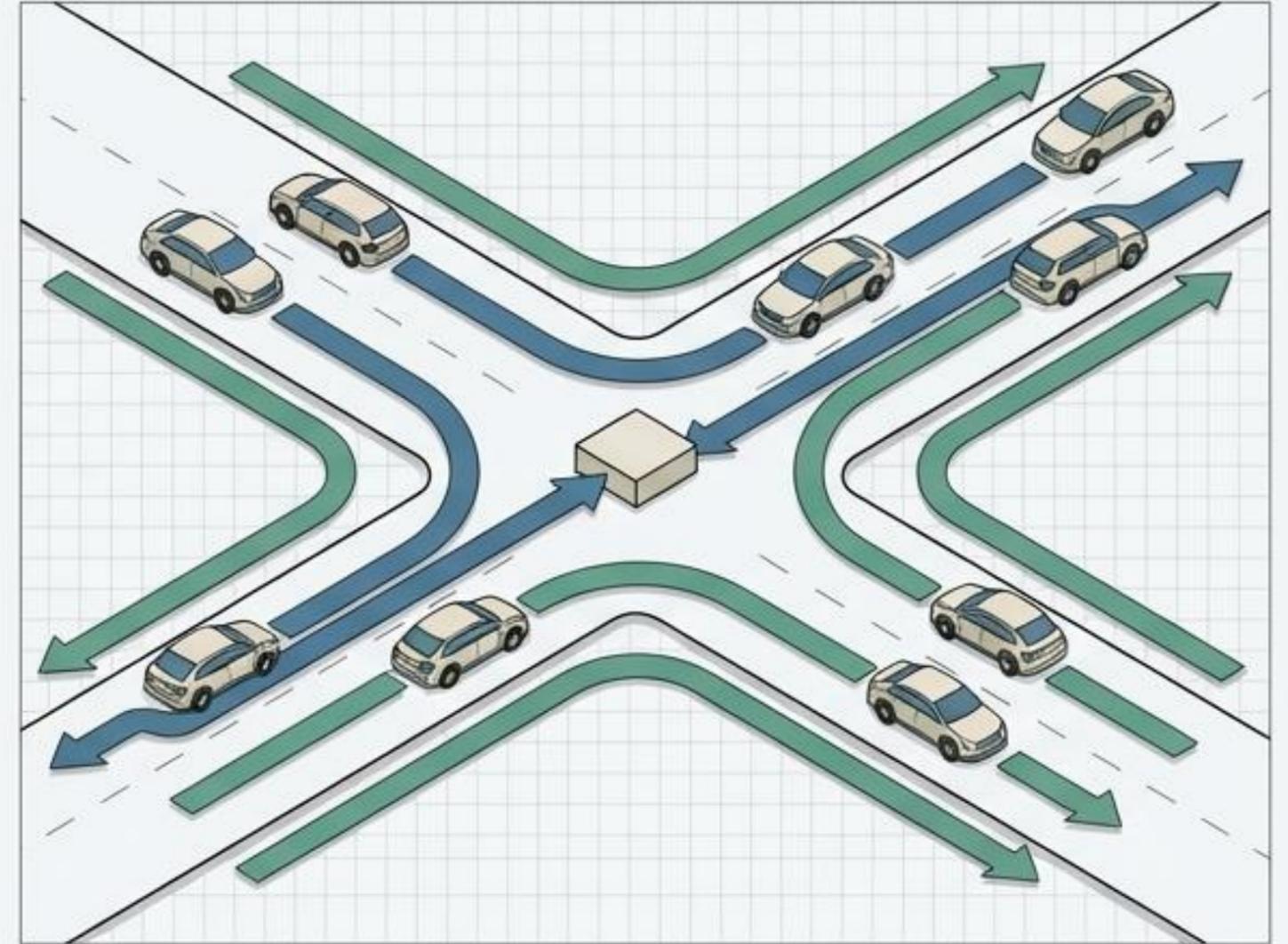
Legacy Reactive Routing



The Bottleneck

Sudden telemetry spikes overwhelm the RSU switch buffer, causing dropped packets and stalled inference for cooperative perception.

PTCP Pre-emptive Routing

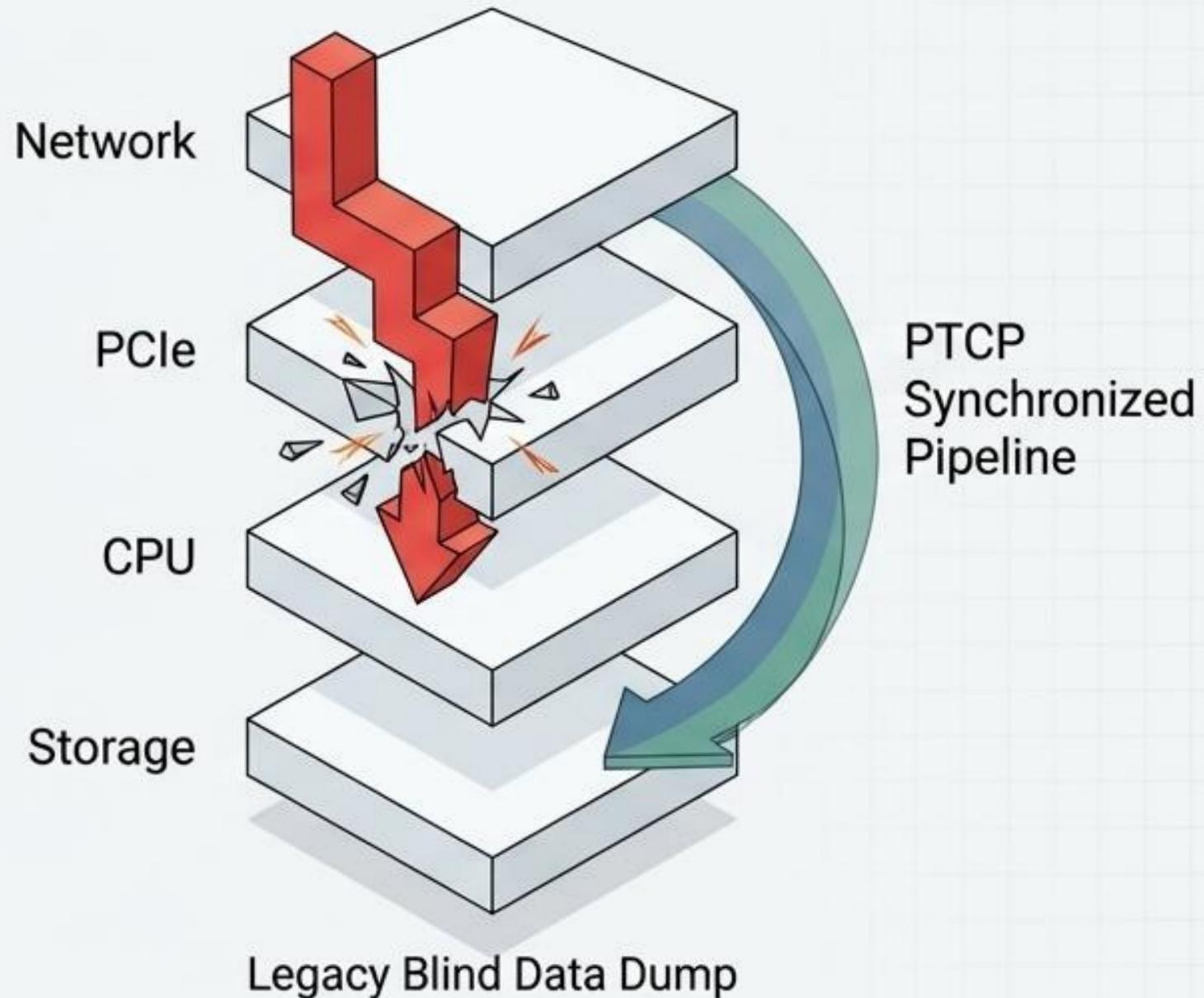


Bounded Routing

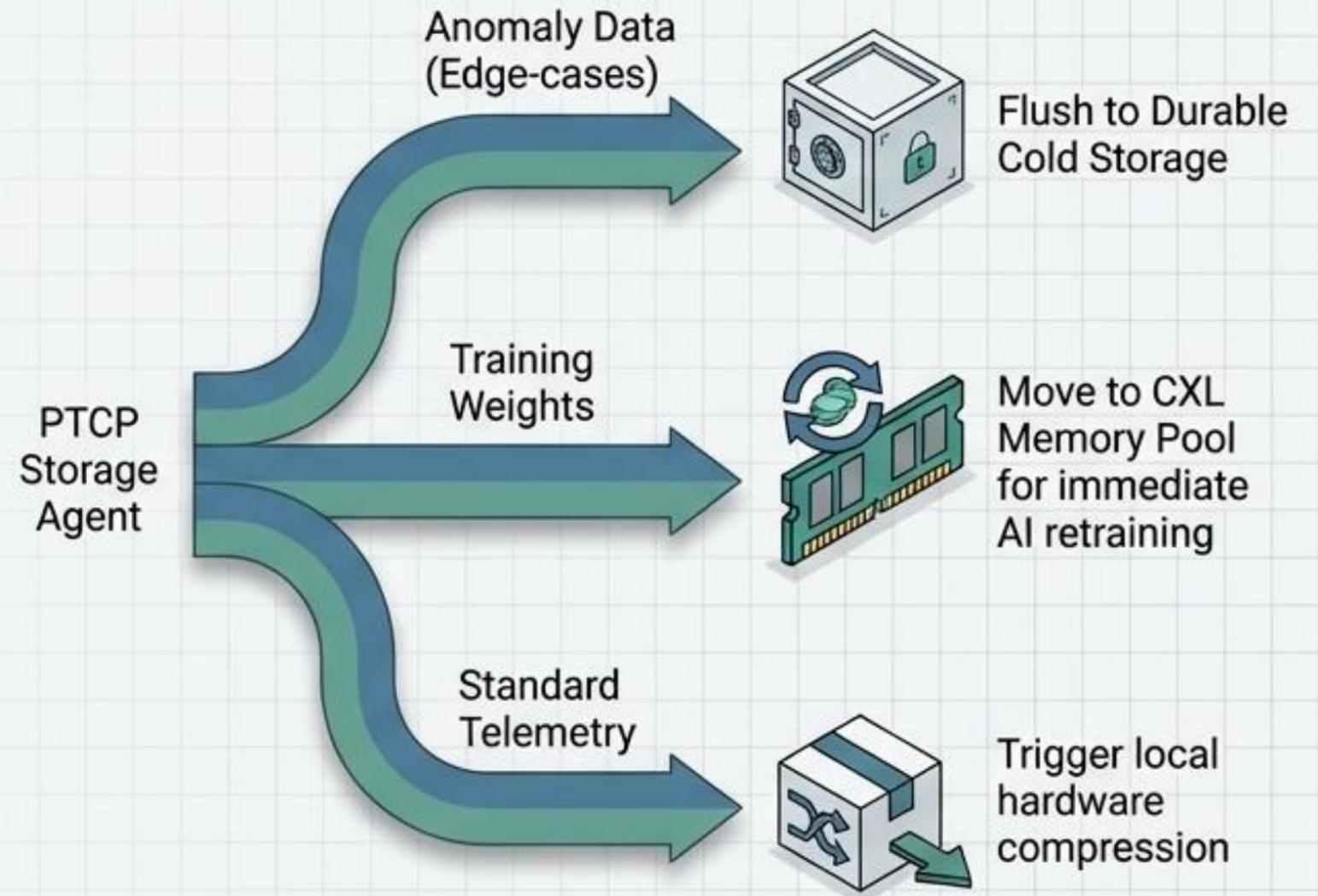
PTCP forecasts congestion and pre-emptively paces non-critical data before pressure forms, guaranteeing sub-millisecond latency for V2X safety telemetry.

The Depot: Synchronized State Transfers

Cross-Layer Synchronization

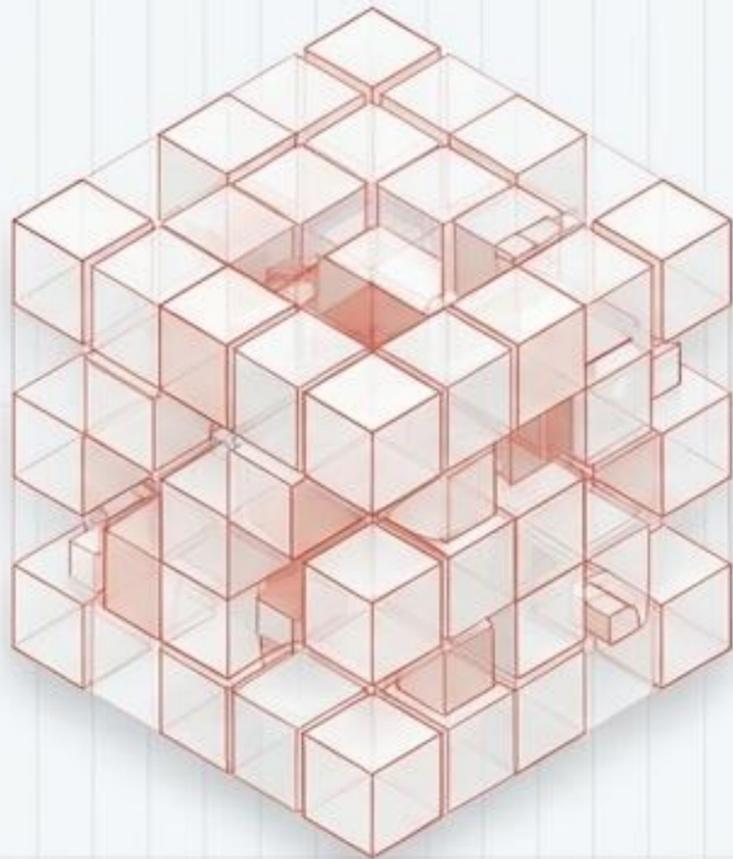


Predictive Tiering Matrix



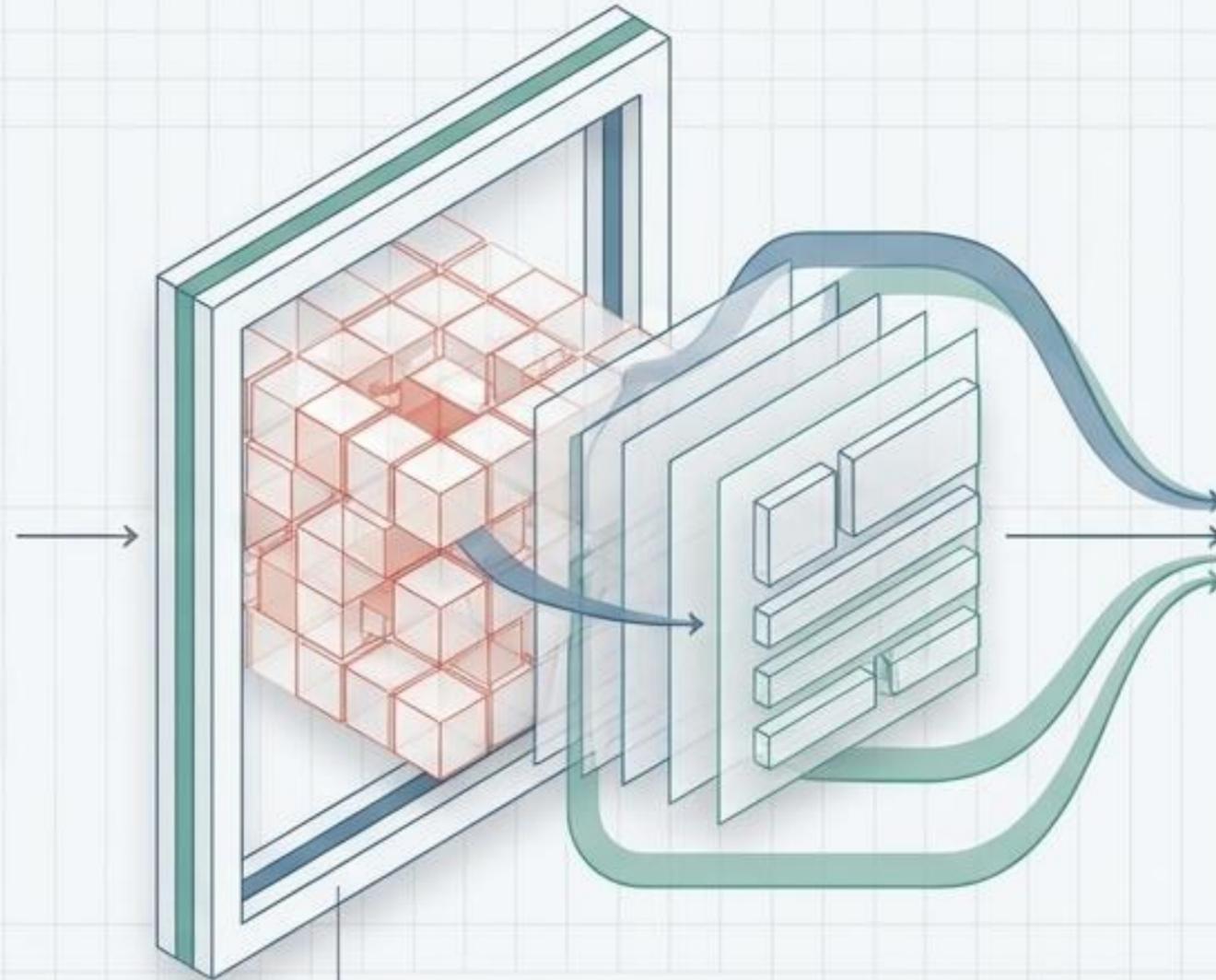
Fleet Learning: The Principle of Compact Exchange

The Curse of Dimensionality



Petabytes of dense fleet parameters
(weather, traffic, sensor states)

Stage 1
The Raw State



Onboard PoL-TT Agent

Stage 2
The Transformation

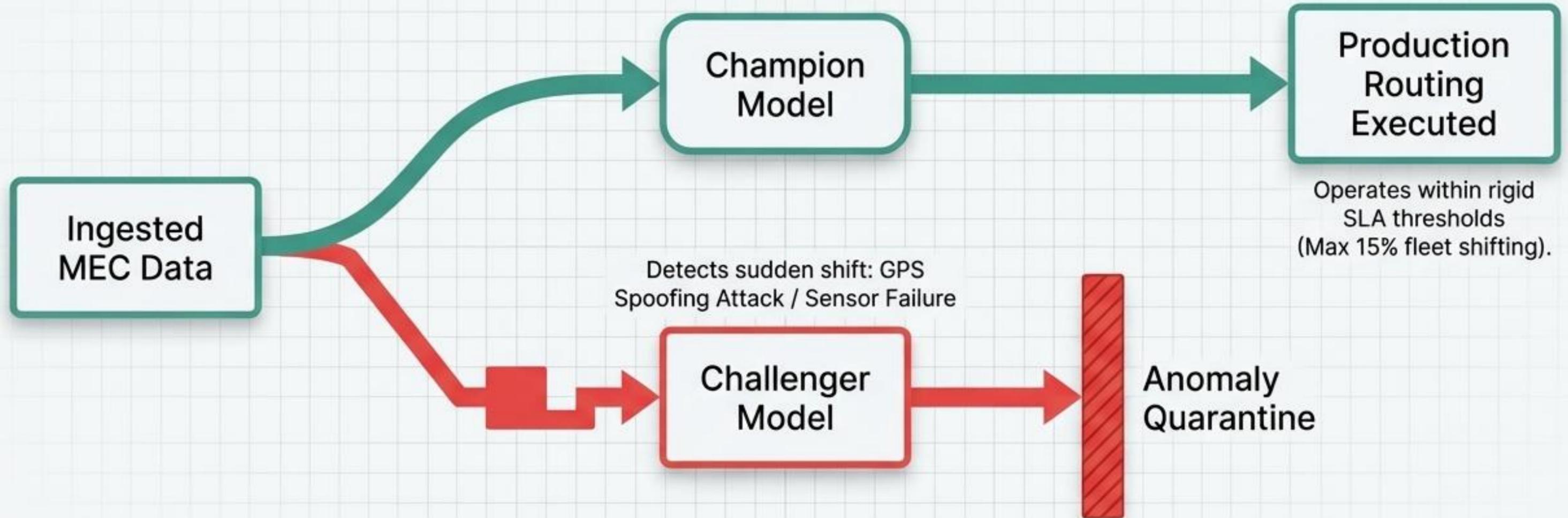
$$P[i_1, \dots, i_d] = \sum G^{(1)}[1, 1, a_1] G^{(2)}[a_1, i_2, a_2] \dots G^{(d)}[a_{d-1}, i_d, 1]$$

Mathematical Summaries

Vehicles do not upload raw behavioral data. They normalize data into a state vector, sending only compact tensor summaries (marginals and deltas) to the central orchestration cloud.

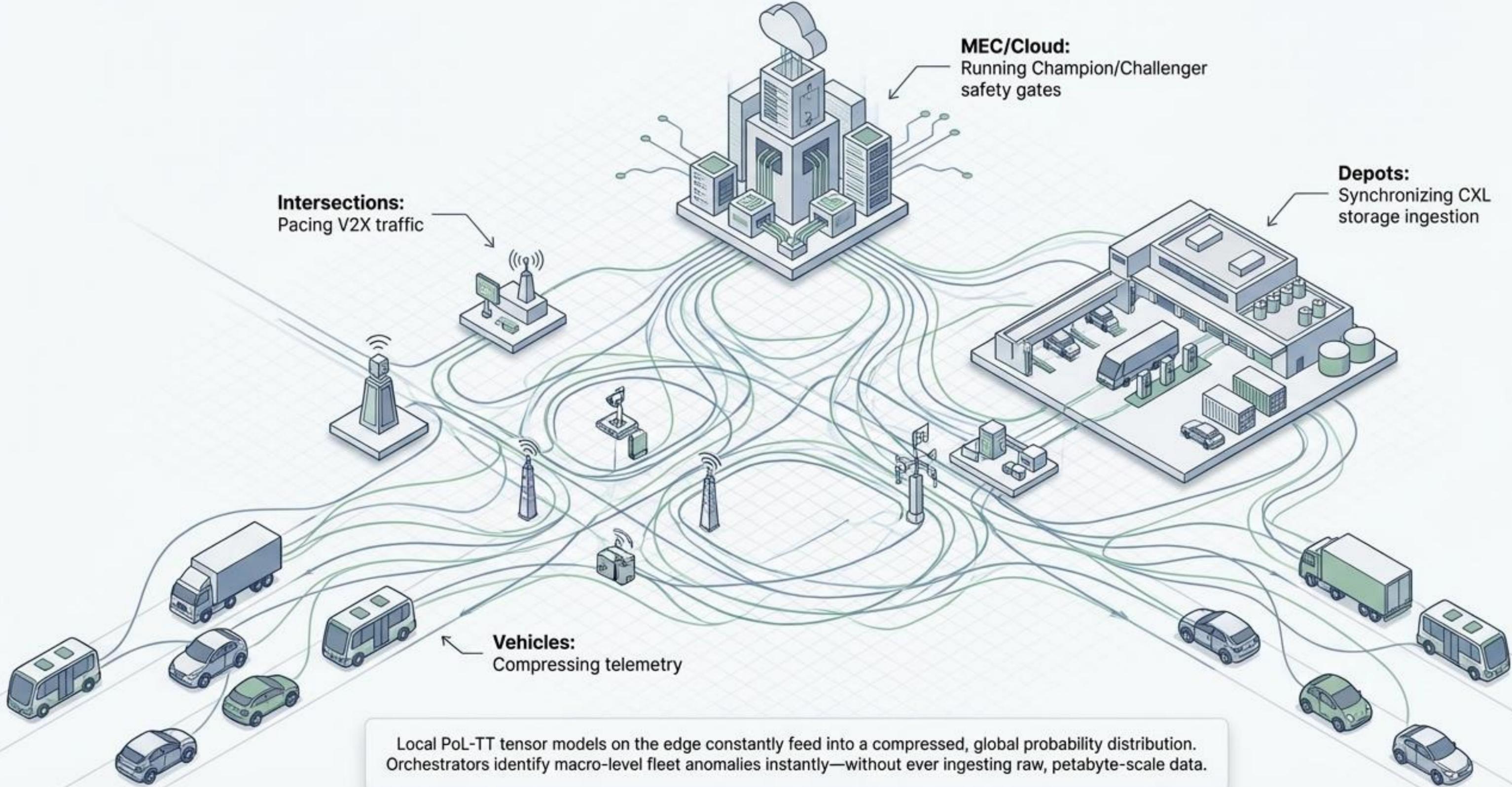
Stage 3
The Output

Safety Envelopes & Bounded Autonomy

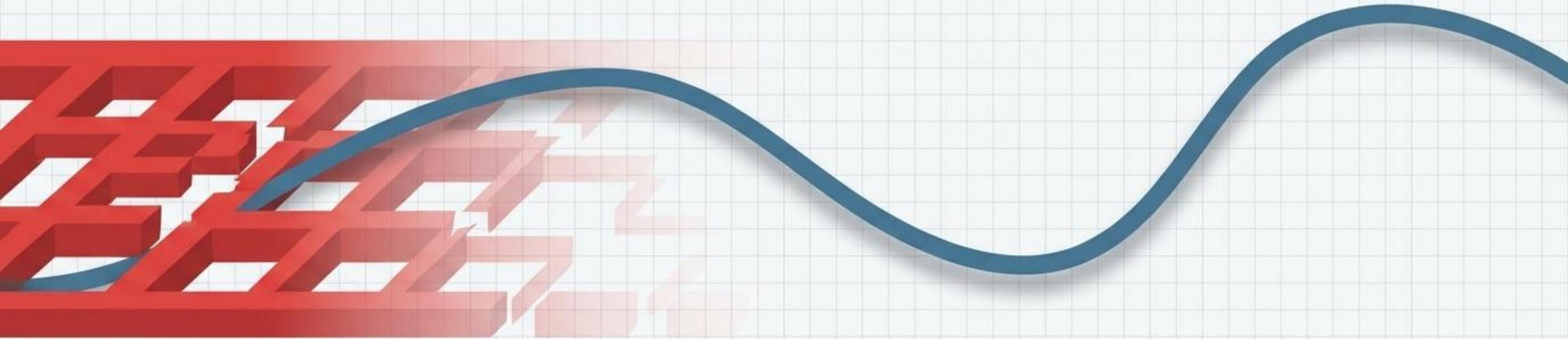


Predictive networks cannot learn pathological states as a new baseline. PTCP operates under strict, bounded closed-loop control to guarantee fleet safety.

The Unified Mobility Edge Control Plane

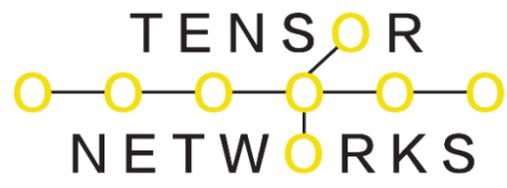


From Physical Constraints to Mathematical Tractability



Autonomous fleets have surpassed the limits of reactive hardware.

By deploying the Predictive Tensor Control Plane, infrastructure is no longer defined by the limits of bandwidth and storage I/O. It is defined by synchronized, predictive mathematics.



Thank You for Your Partnership We look forward to building the future of networking together. Please don't hesitate to reach out with any questions.

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information@tensornetworks.net