XMCP - Architecture Overview

The adaptive execution pipeline, layer by layer

A workload flows through nine layers. Each observes, decides and reshapes execution deterministically.

Pipeline

- Input - validated ingest of workload descriptors with valid/ready handshaking.
- Workload DNA - builds a signature and classifies the workload regime.
- XFlow Scheduler - routes execution paths across active banks by congestion.
- Predictive Memory - prefetches reused data; reports prediction confidence.
- Adaptive Precision - per-operation precision selection.
- Sparse Compute - zero-lane detection and gating.
- Optimization - closed-loop tuning across the pipeline.
- Evidence - per-claim proof assembled from runtime outputs.
- Decision Intelligence - decision timeline and confidence across stages.

Hybrid execution

Fast Simulation runs the architectural runtime for interactive evaluation (model estimate). RTL Validation compiles and runs the real SystemVerilog through Icarus Verilog (iverilog), producing functional pass/fail evidence and a Fast-vs-RTL comparison.