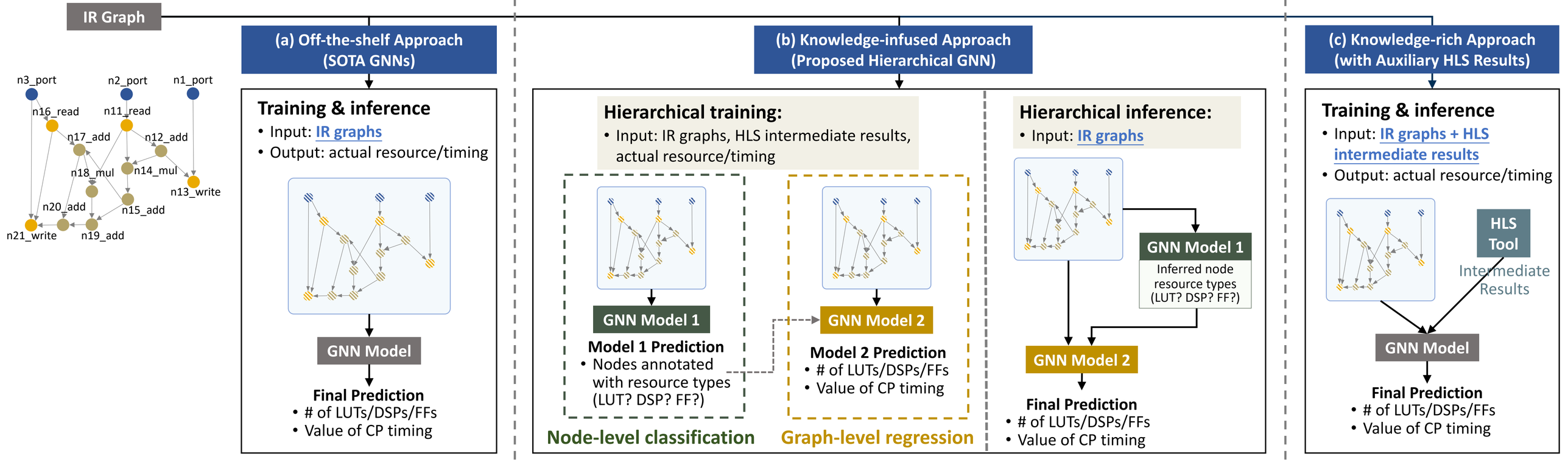
IR Graph
n3_port
n2_port
n1_port
n16_read
n11_read
n17_add
n12_add
n18_mul
n14_mul
n13_write
n20_add
n15_add
n21_write
n19_add
(a) Off-the-shelf Approach (SOTA GNNs)
Training & inference
• Input: IR graphs
• Output: actual resource/timing
GNN Model
Final Prediction
• # of LUTs/DSPs/FFs
• Value of CP timing
(b) Knowledge-infused Approach (Proposed Hierarchical GNN)
Hierarchical training:
• Input: IR graphs, HLS intermediate results, actual resource/timing
GNN Model 1
Model 1 Prediction
• Nodes annotated with resource types (LUT? DSP? FF?)
GNN Model 2
Model 2 Prediction
• # of LUTs/DSPs/FFs
• Value of CP timing
Node-level classification
Graph-level regression
Hierarchical inference:
• Input: IR graphs
GNN Model 1
Inferred node resource types (LUT? DSP? FF?)
GNN Model 2
Final Prediction
• # of LUTs/DSPs/FFs
• Value of CP timing
(c) Knowledge-rich Approach (with Auxiliary HLS Results)
Training & inference
• Input: IR graphs + HLS intermediate results
• Output: actual resource/timing
HLS Tool
Intermediate Results
GNN Model
Final Prediction
• # of LUTs/DSPs/FFs
• Value of CP timing