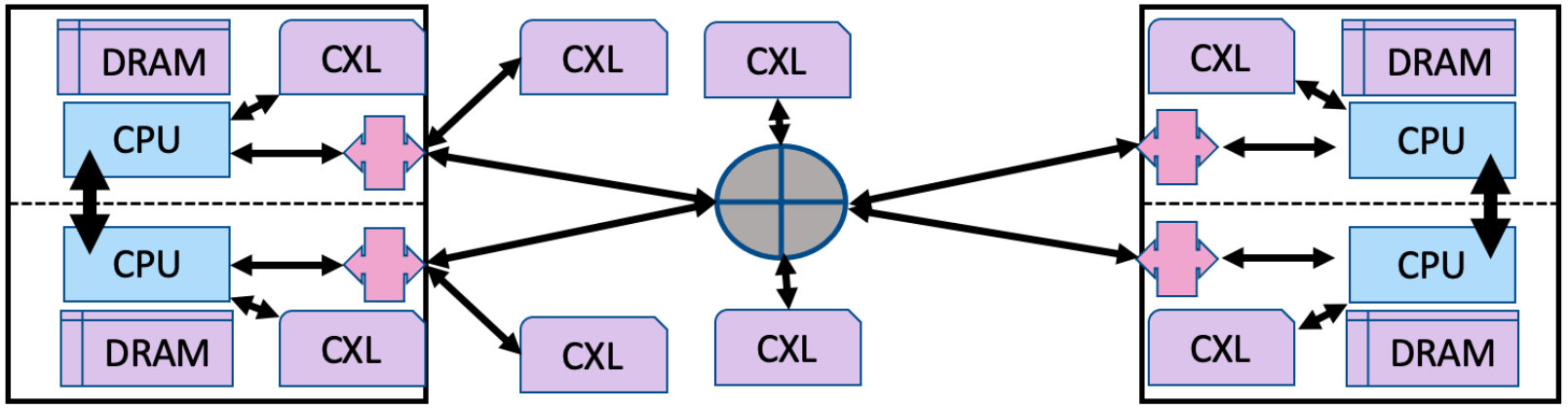
# Making Hierarchical CXL Work

Andy Banta – Storage Janitor

Magnition IO

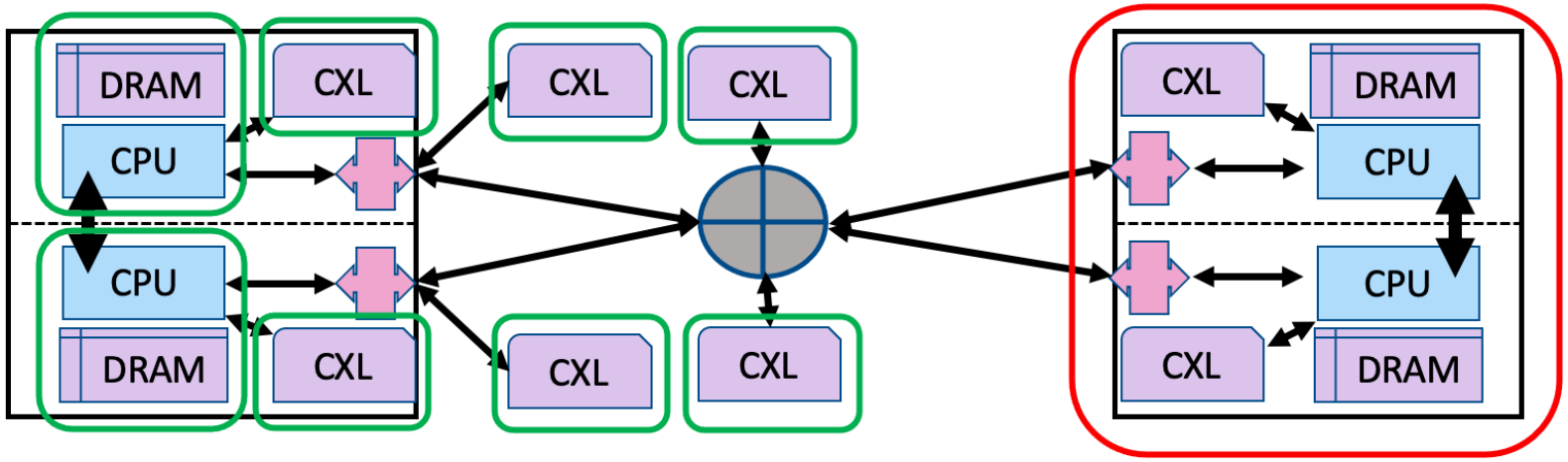
# CXL Topology in Theory

Flat memory access



# CXL Topology in Practice

Skewed, inconsistent memory access




9 NUMA zones with contention

# A Different Approach to Optimization

Compose simulations of complex memory and storage

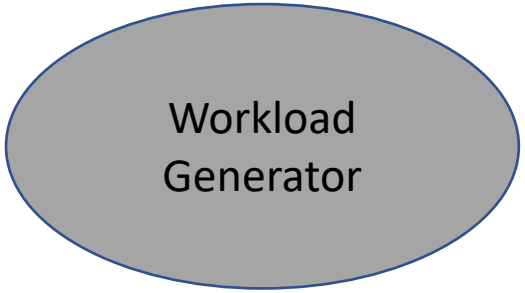
Break the simulation into components

Allows the components to be assembled like building blocks

Provide reasonable but constrained set of variables

Run simulations with synthetic data or actual IO traces

# Test Drive CXL Environments



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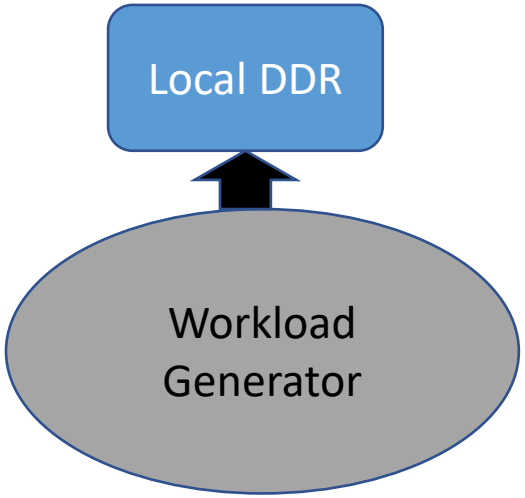

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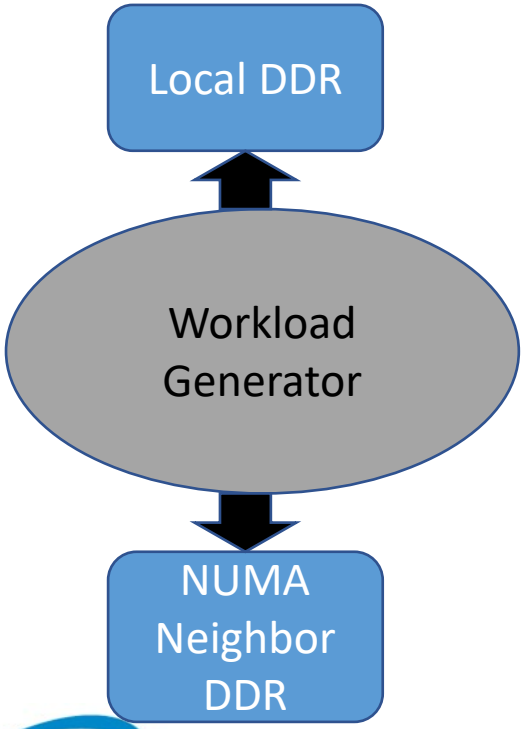

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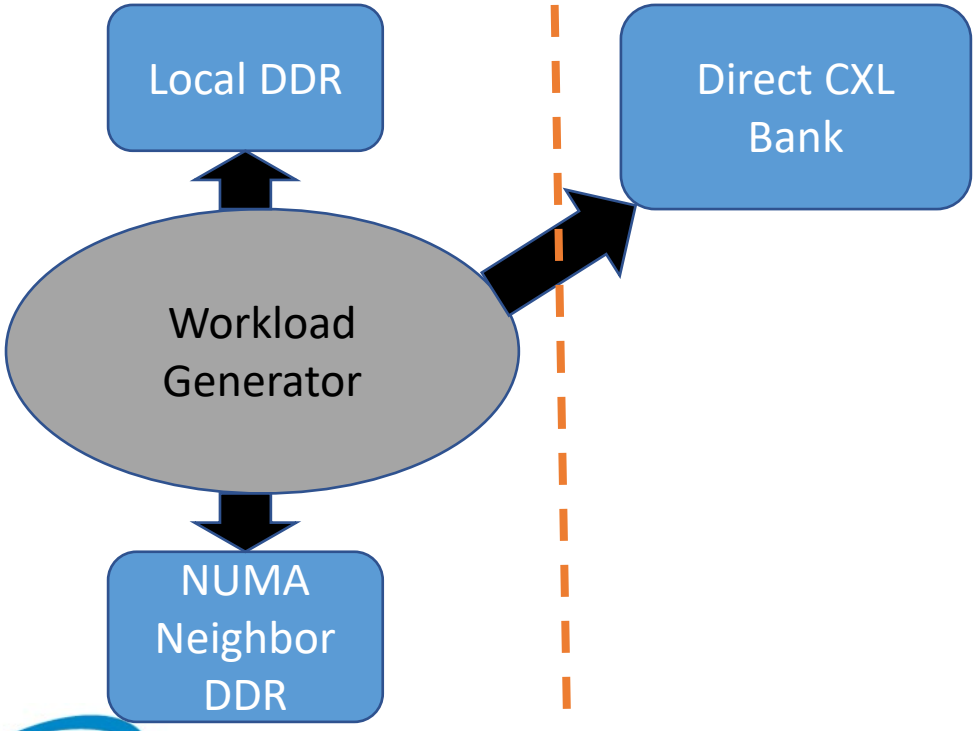

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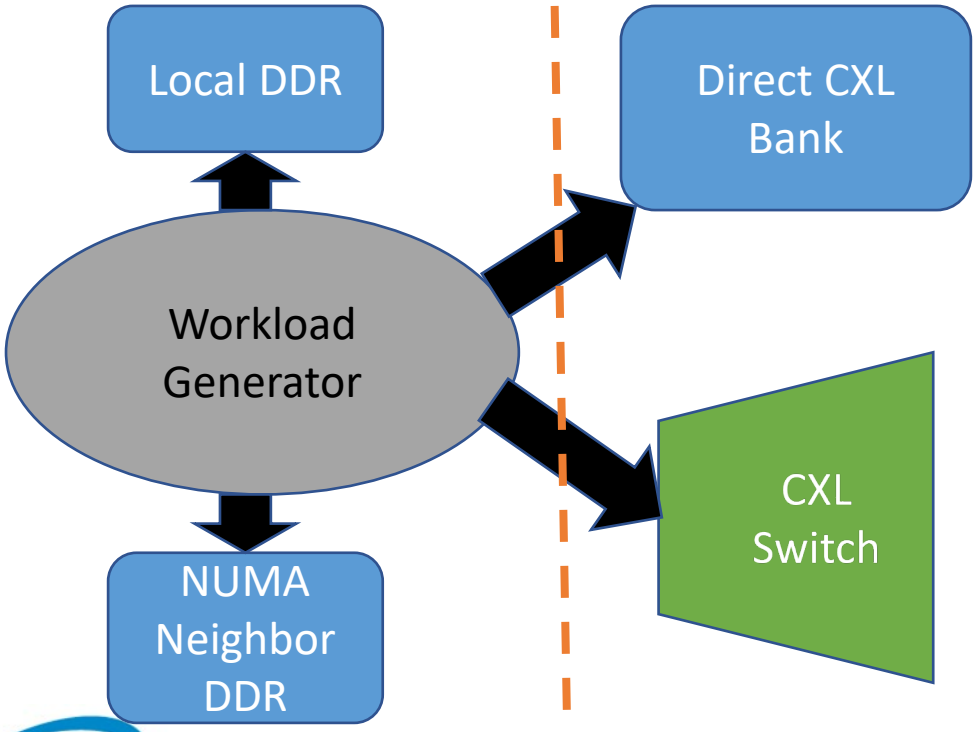

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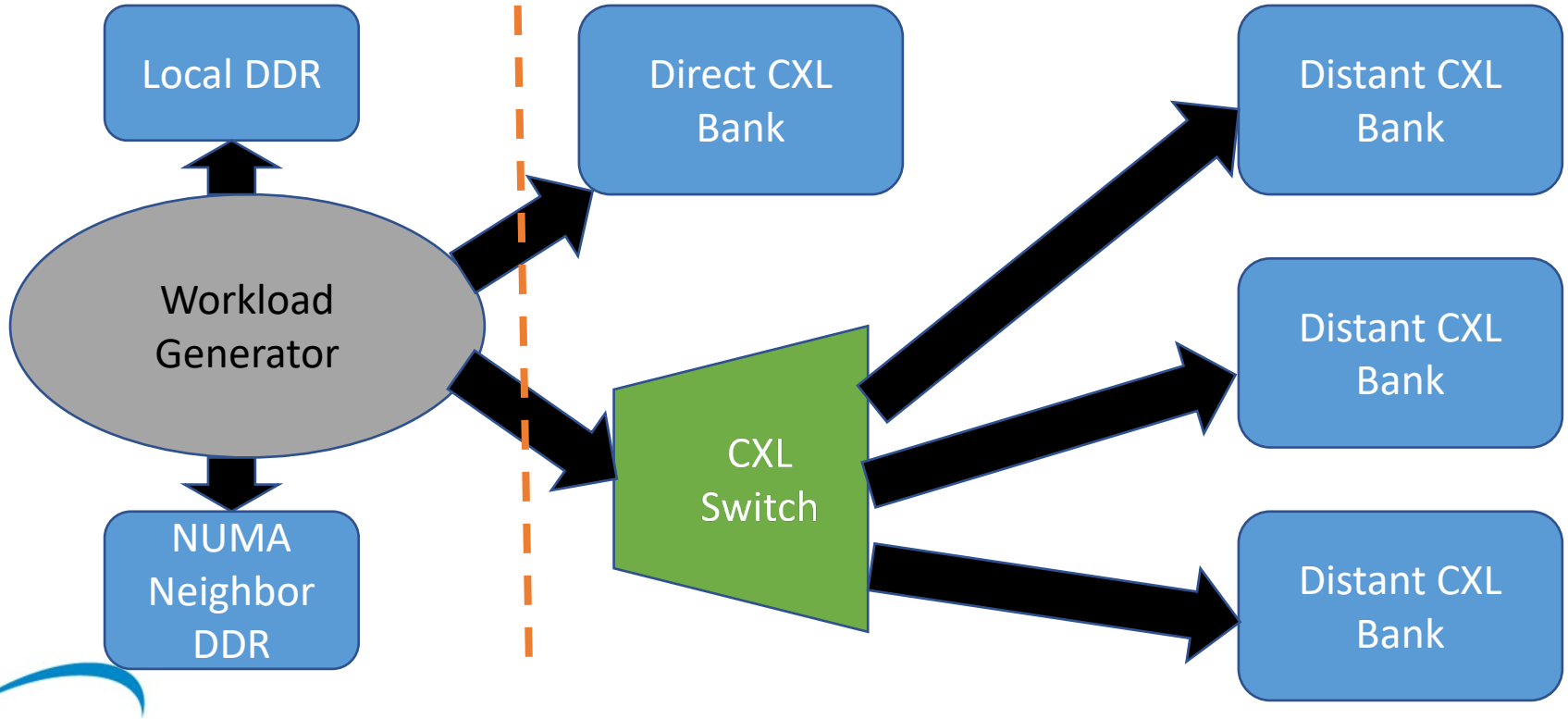

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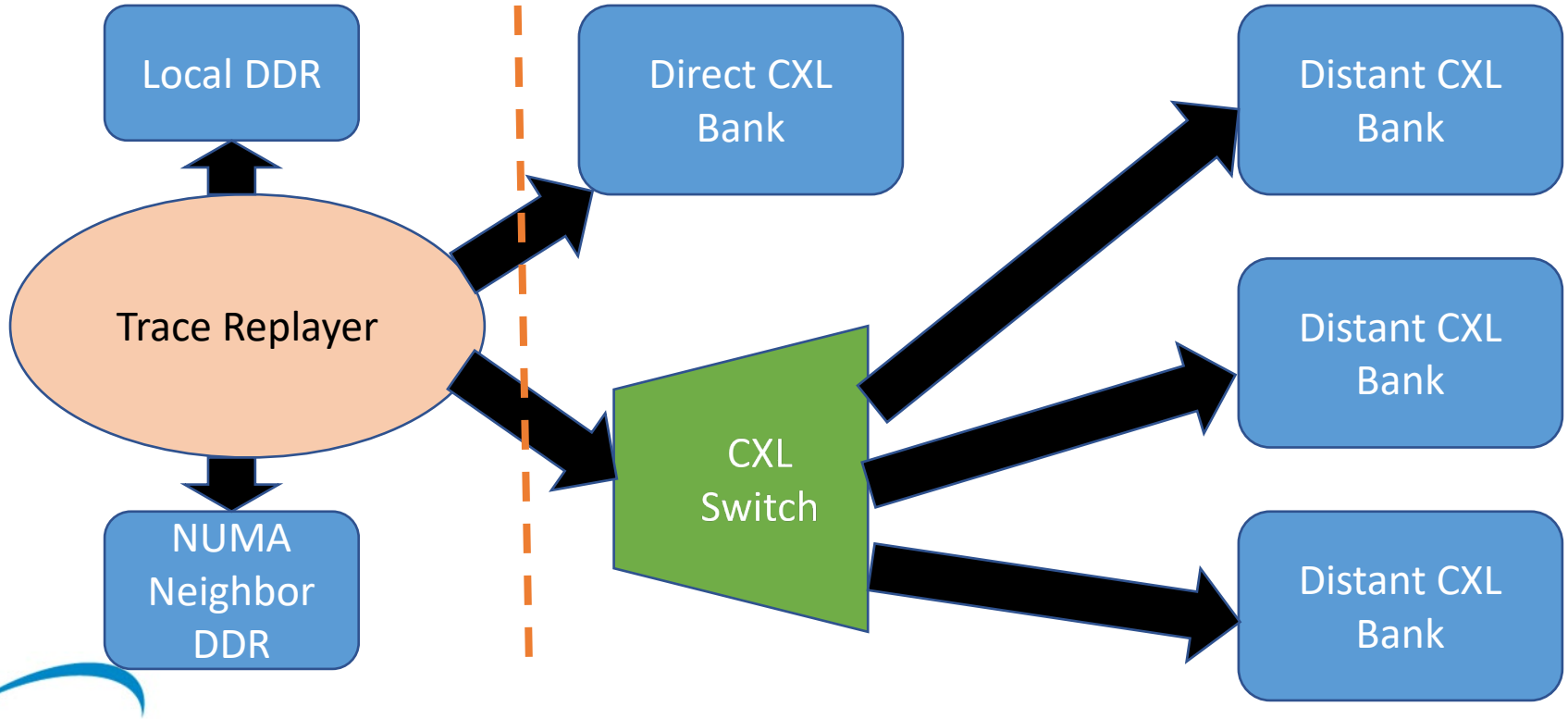

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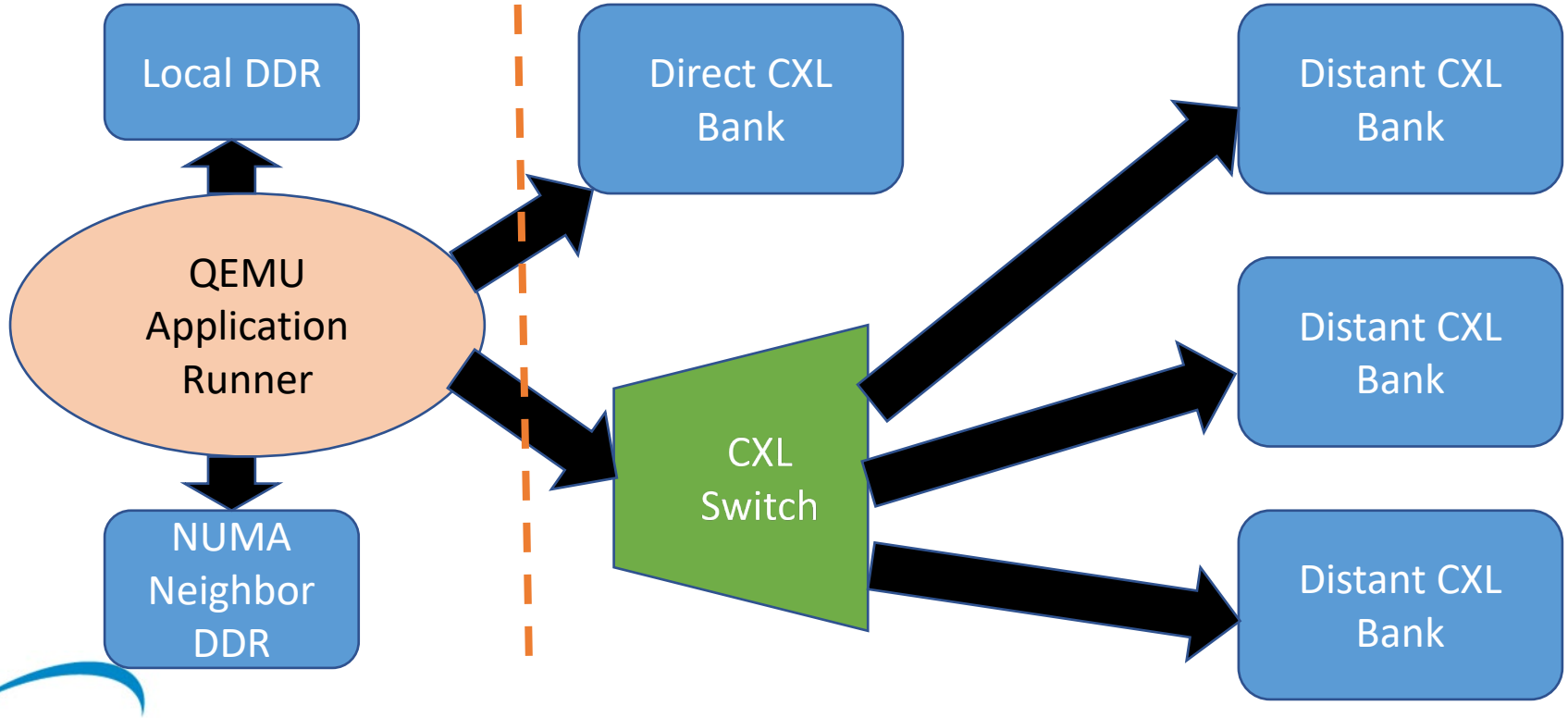

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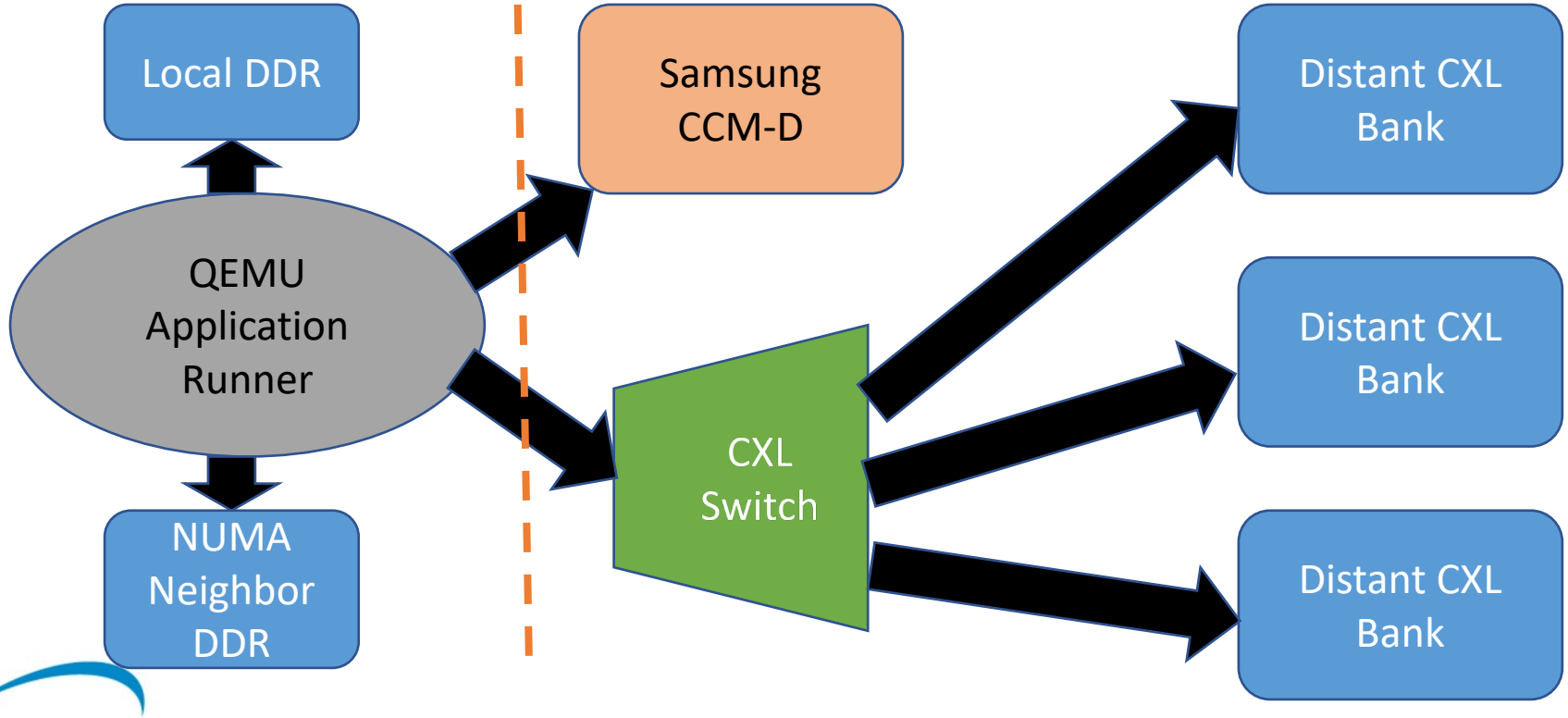

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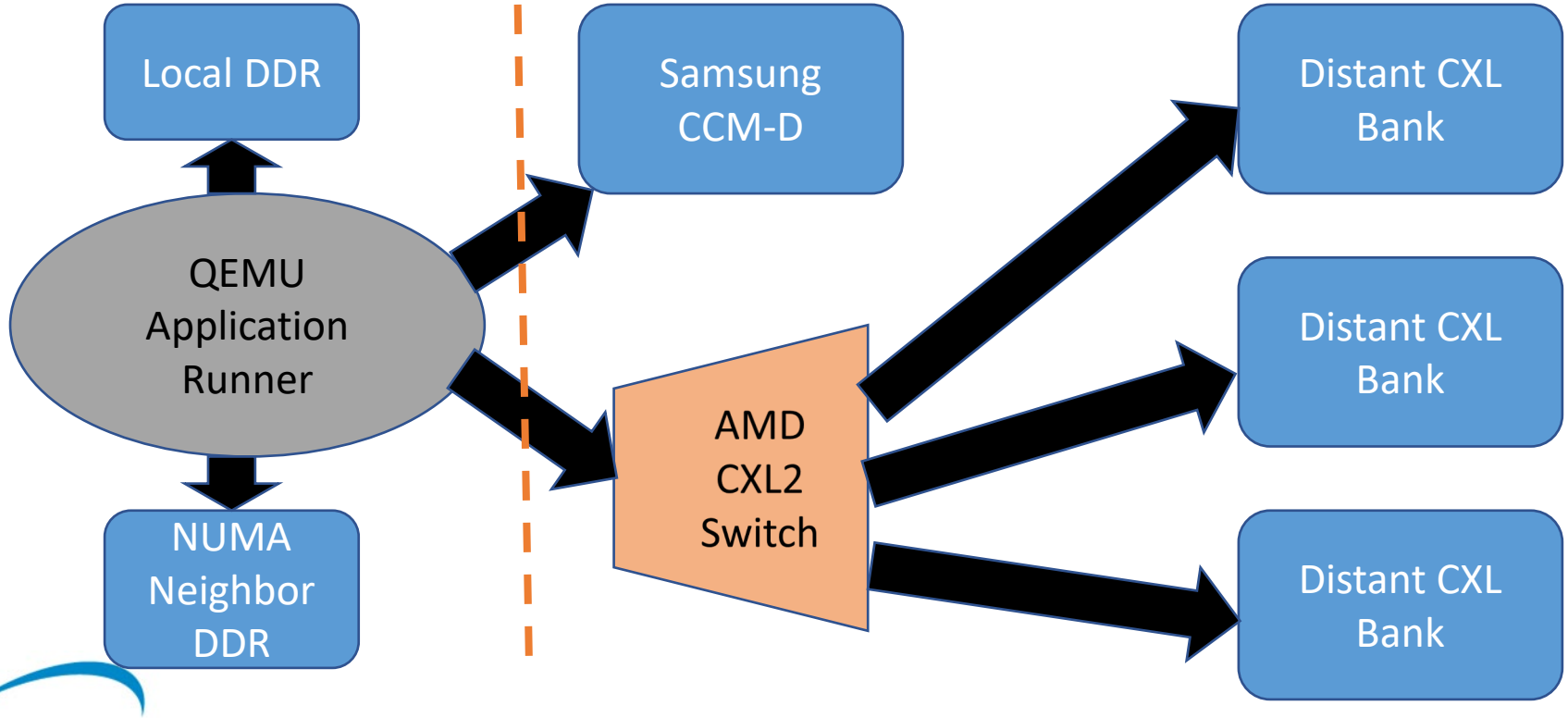

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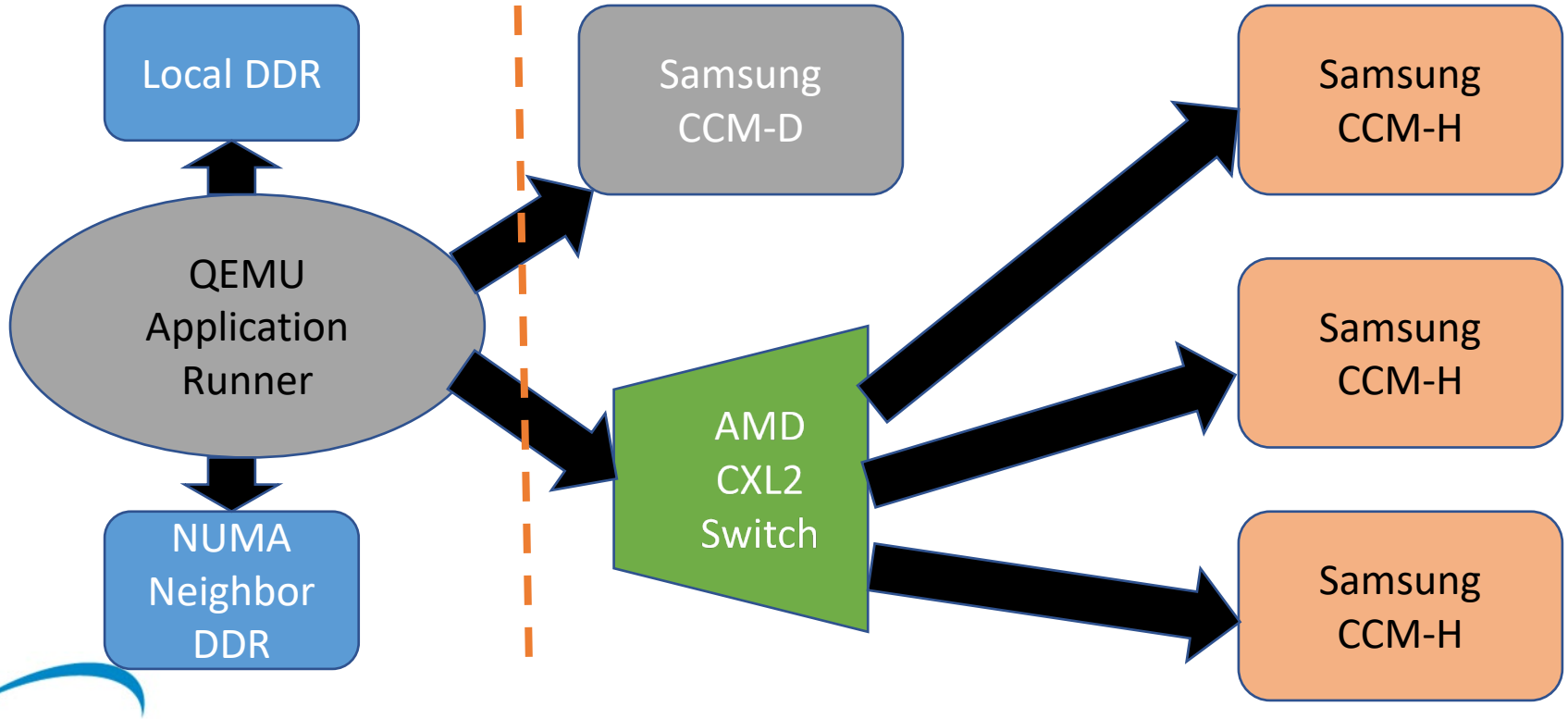

# CXL Value in Test Drives

- Genuine, real-life application engine
  - Better than trace replayer
  - Arbitrary app with timing consistency
- CXL mem or cache component
  - As complex or simple as required
- CXL switch component
  - As simple or complex as required
- Not just correctness. Repeatable, discrete, and timing accurate

# Try out CXL before you can buy it