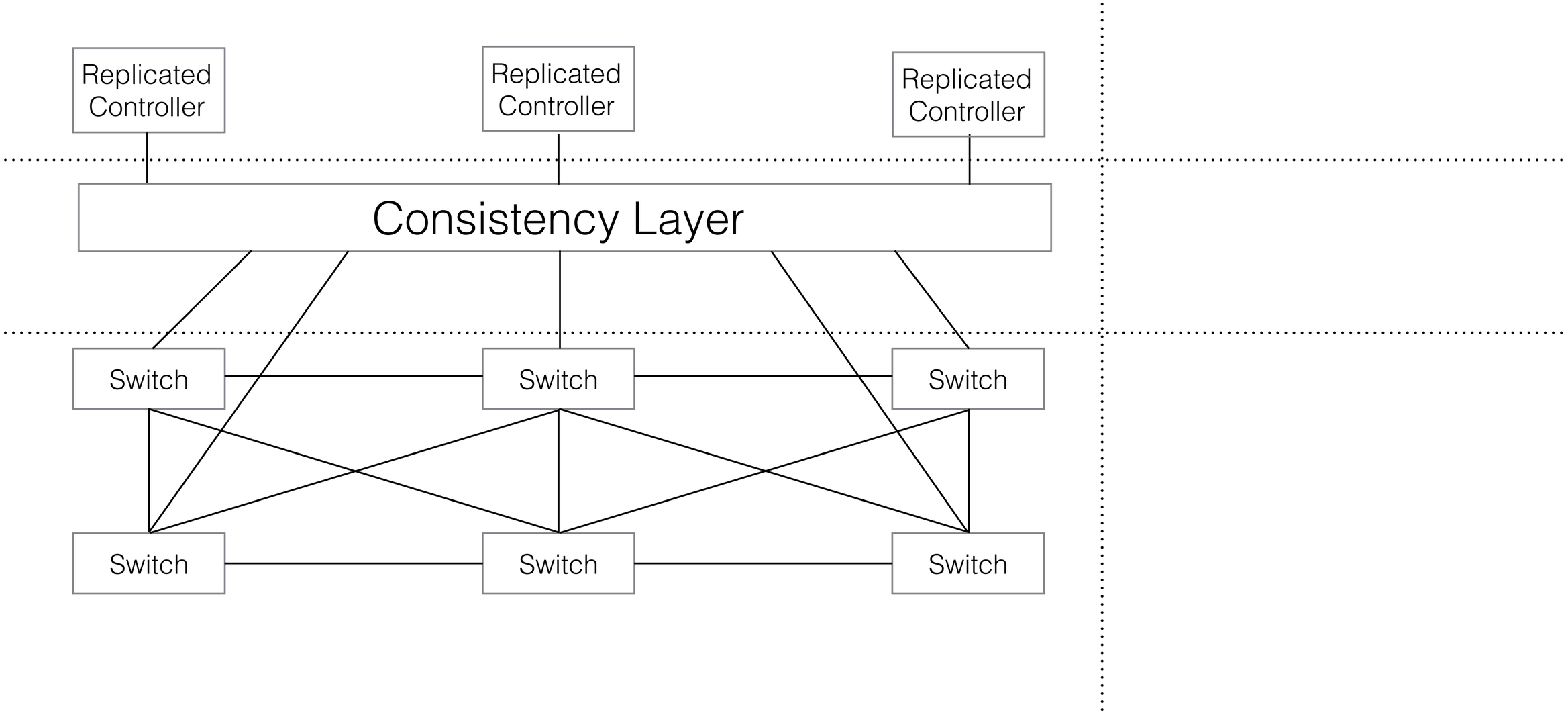
Consistency in SDN

Aurojit Panda, Wenting Zheng, Xiaohe Hu, Arvind Krishnamurthy, Scott Shenker

Distributed SDN Today



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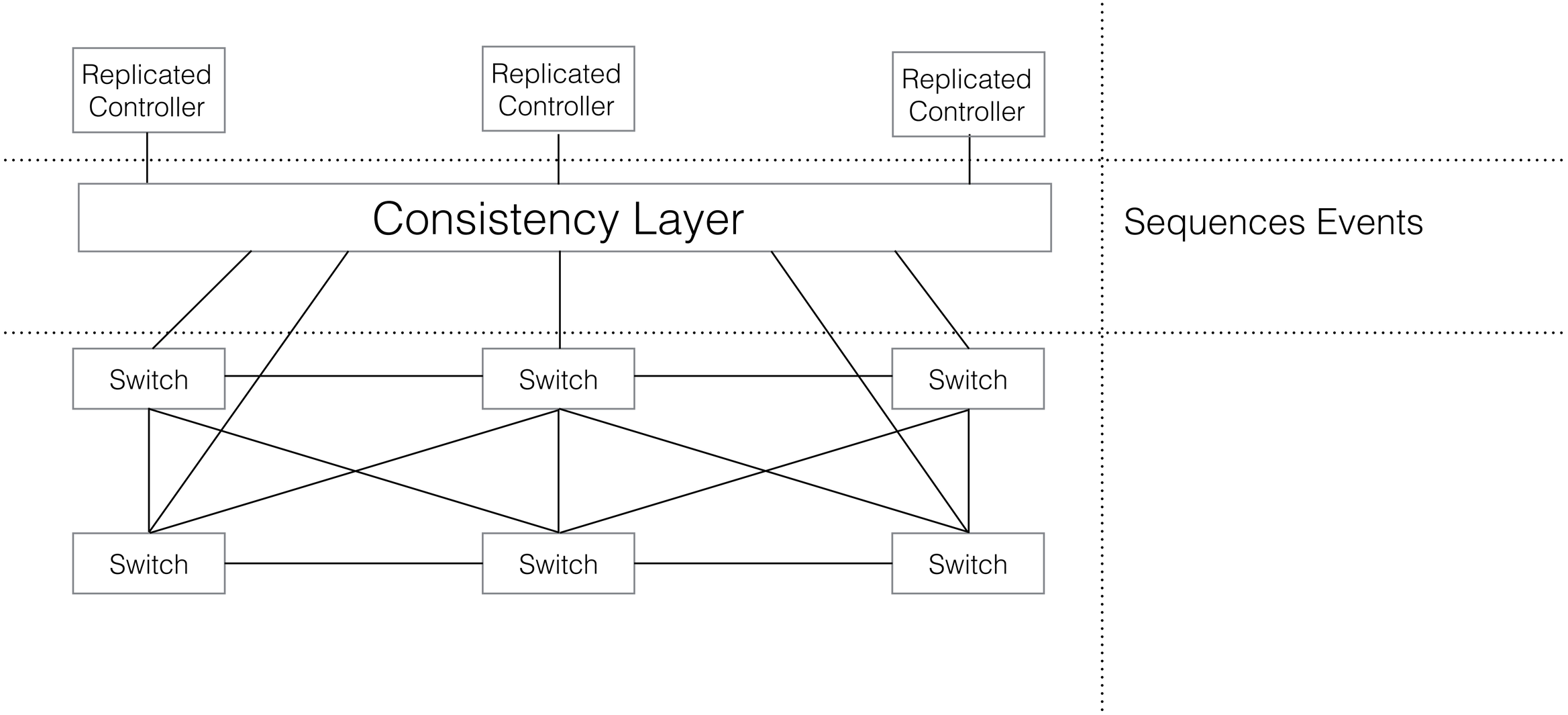

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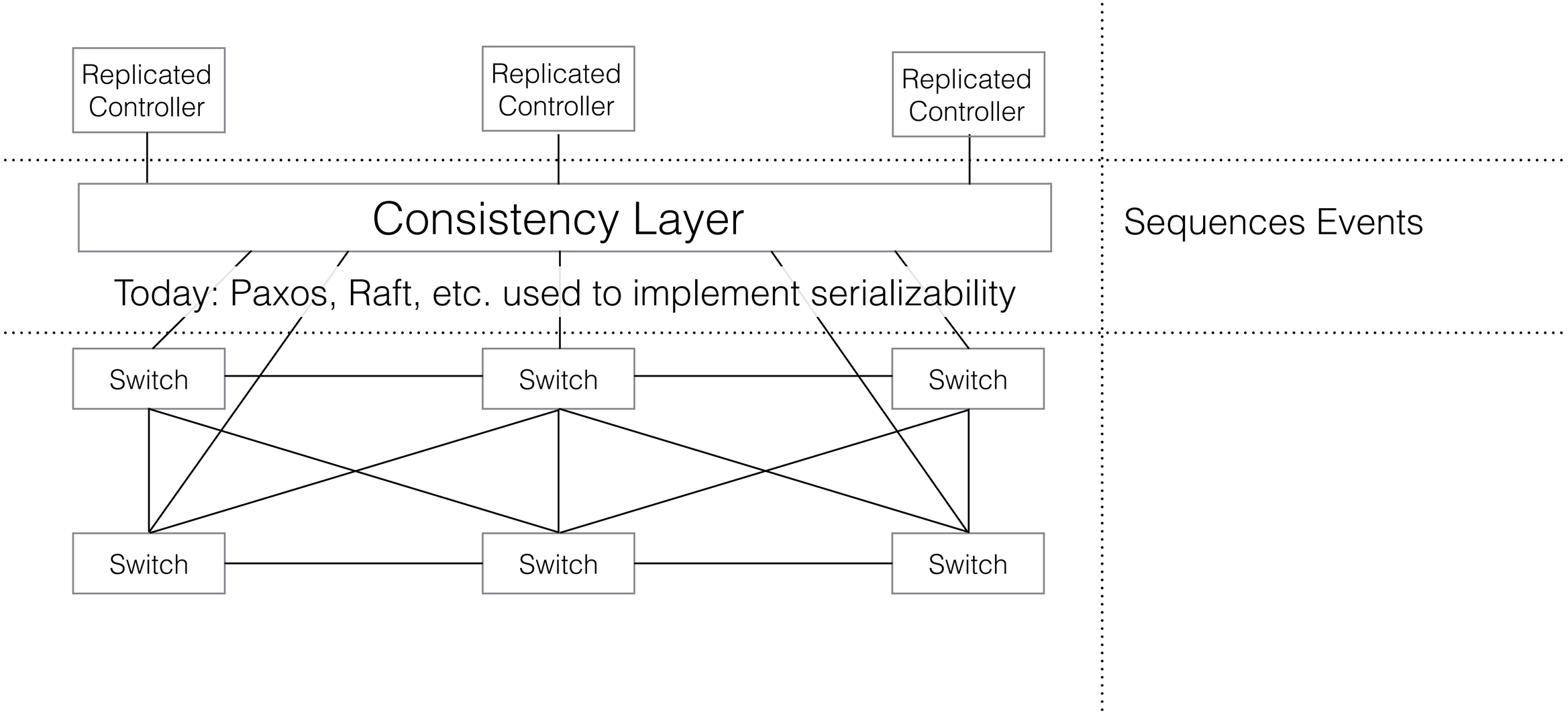
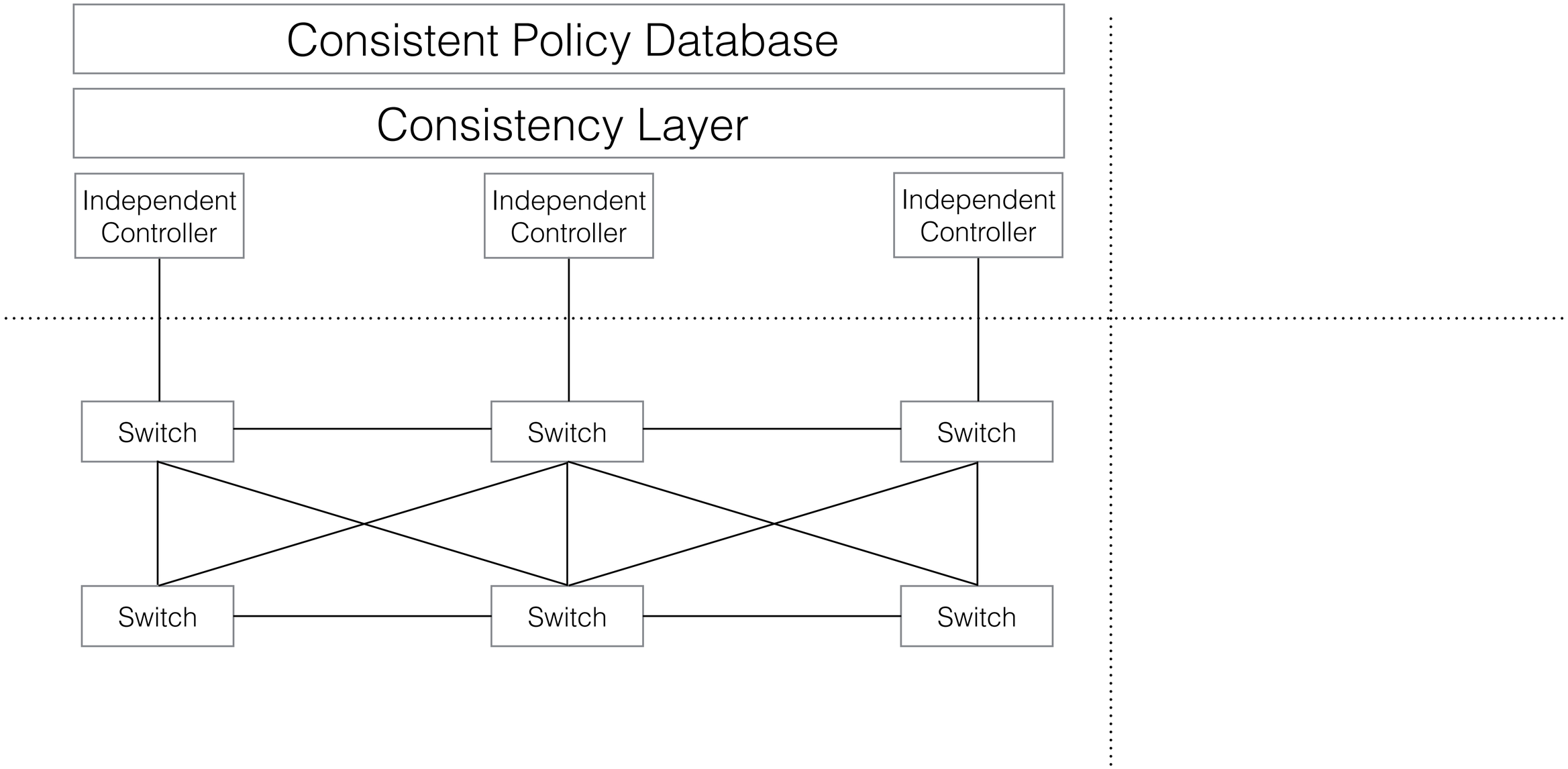


Our Approach



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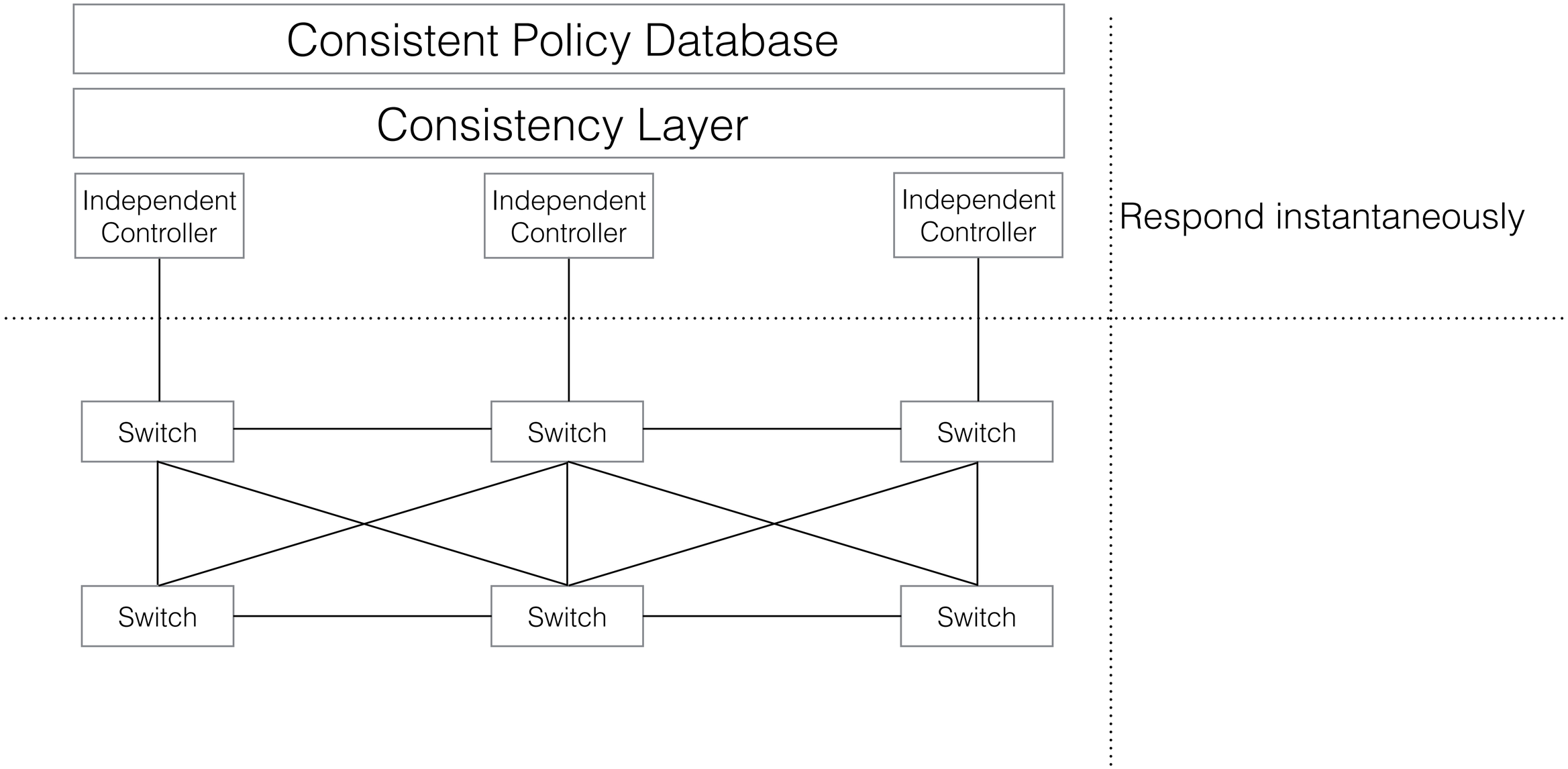

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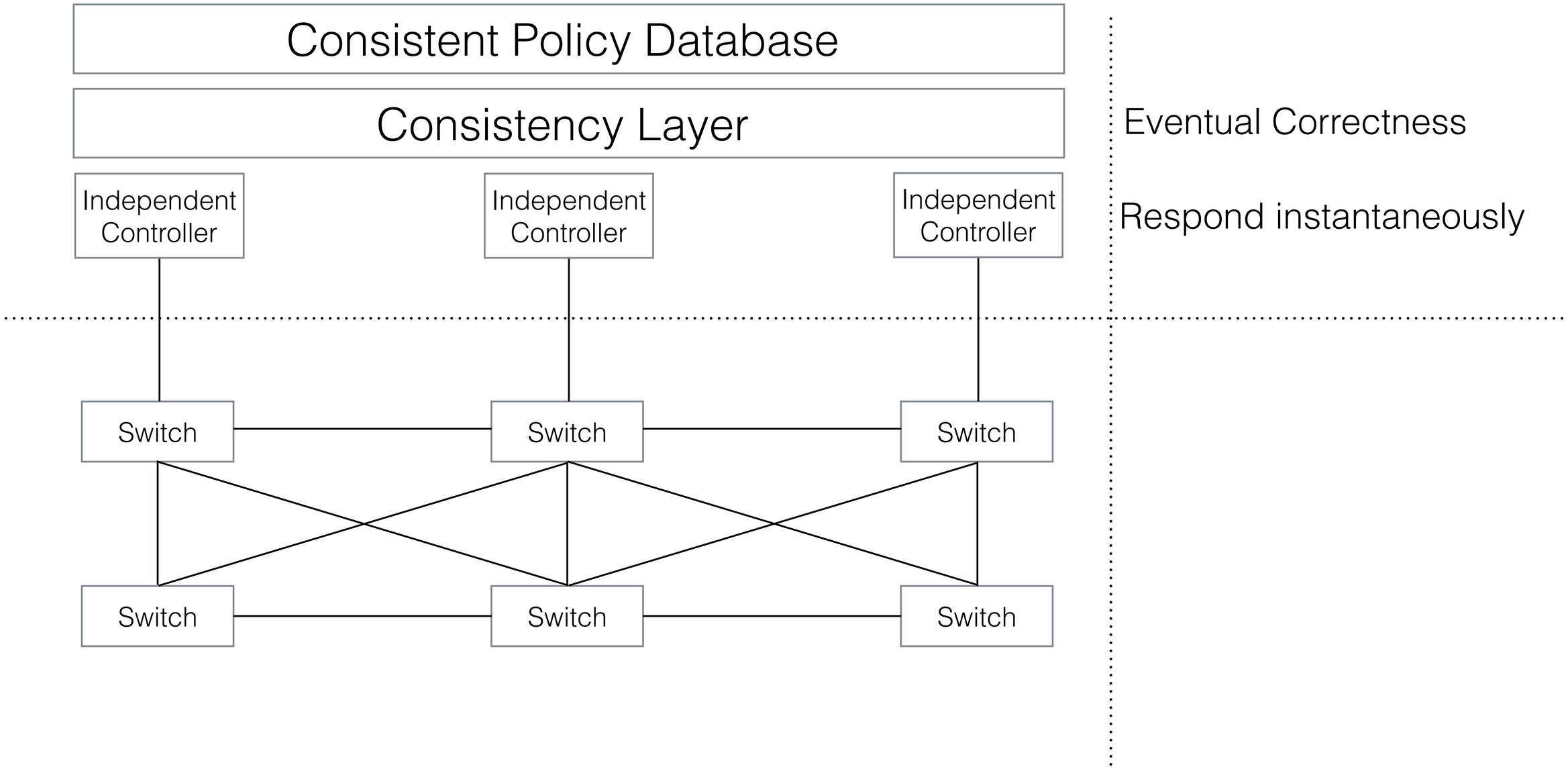

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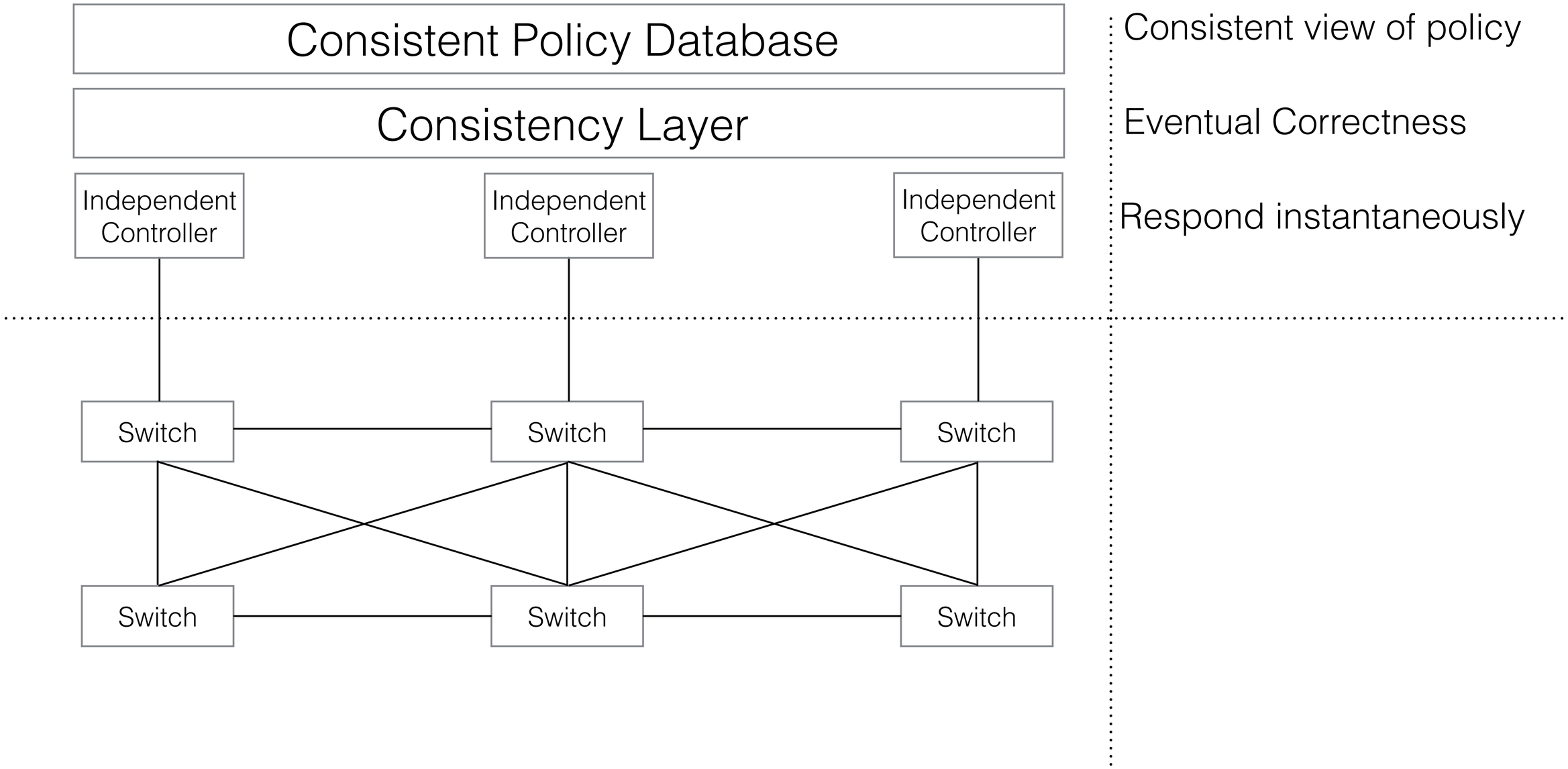

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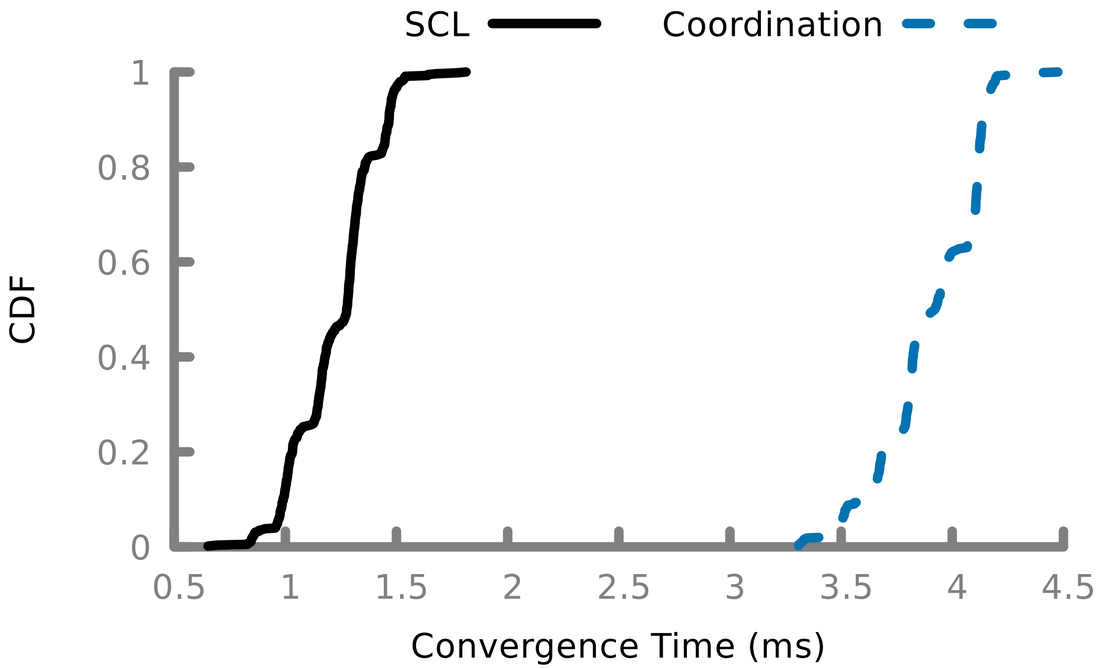

Convergence Time in Data Centers

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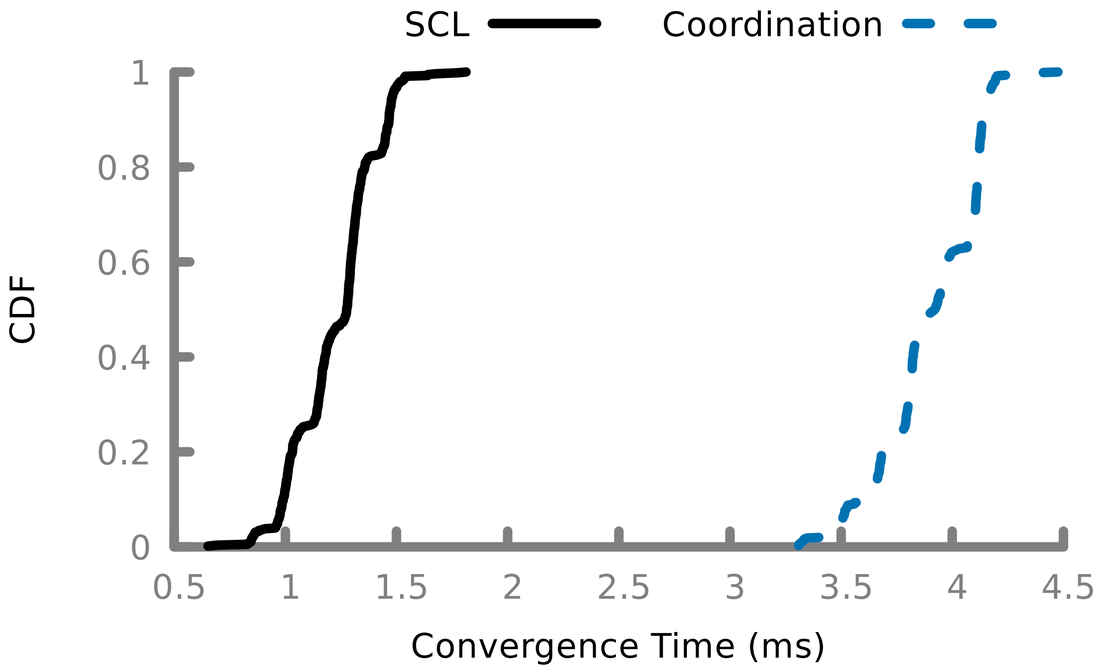

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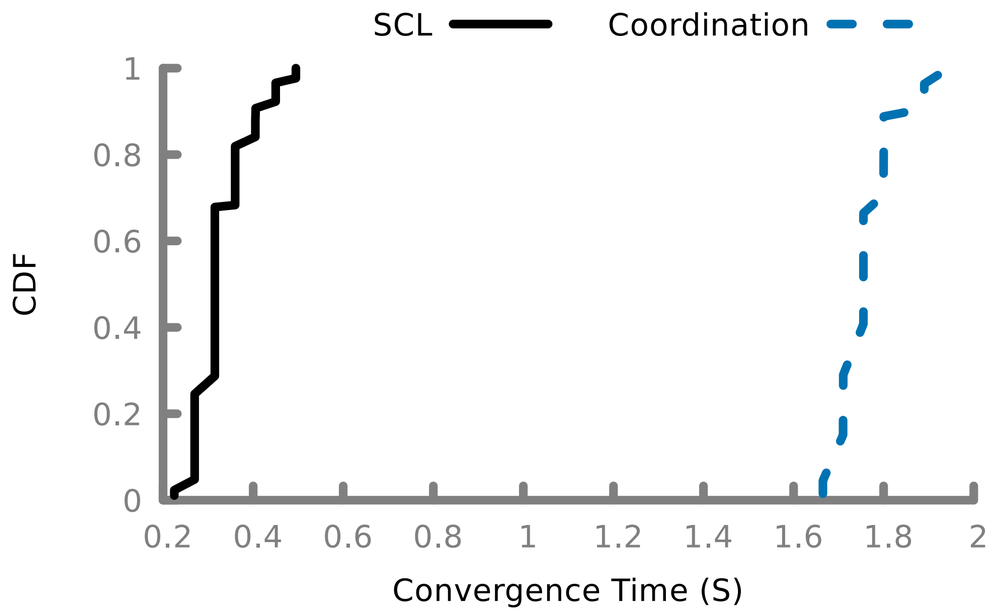

Convergence Time in AS topology

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  - Assuming **deterministic controllers** and **idempotent switch updates**.

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  - Truth can be recovered from the external system.
  - Consistency with ground truth is more important than within the system.

Why is this relevant?

Sources of Network Updates

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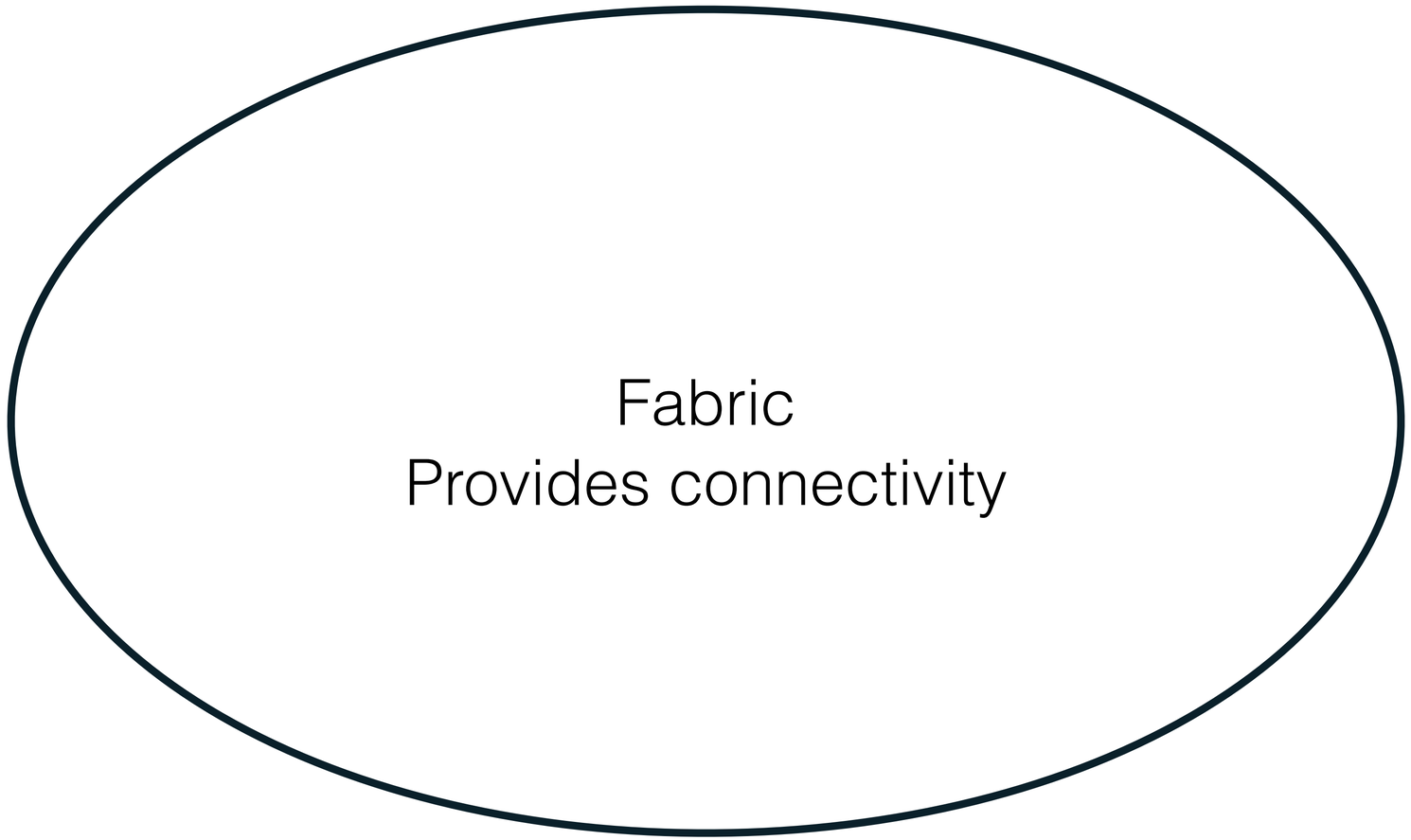
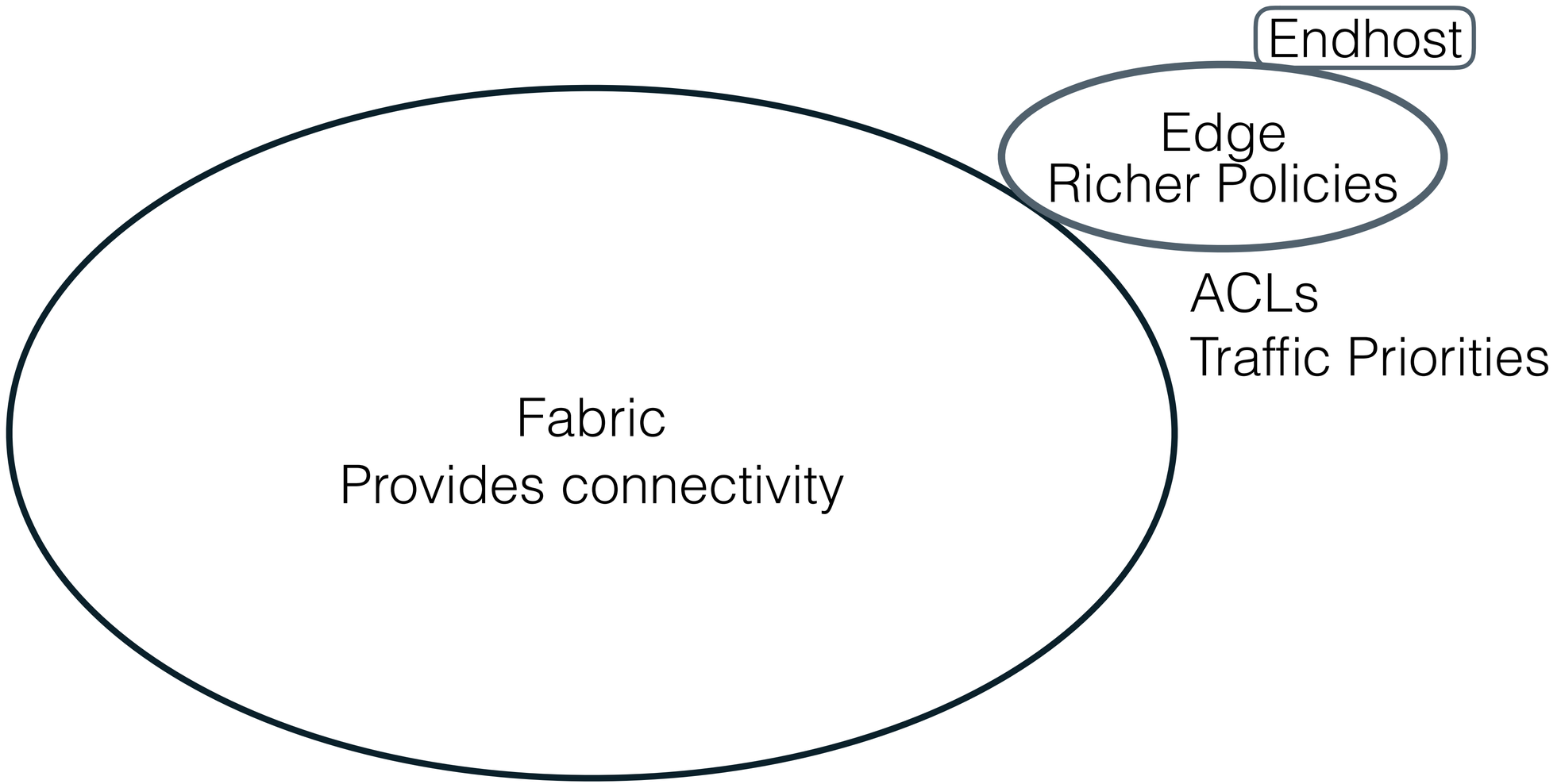
Consistency helps (required?)	Consistency adds latency.

Edge-Core Separation



Routing, Traffic Engineering

Edge-Core Separation



Conclusion

- Existence proof that controller consistency is not necessary.
  - In fact slows down network recovery in response to failures.
- Should we require consistency for SDN controllers?
  - Question is similar to the **ACID** vs **NoSQL** debate in data stores.

Open Questions

- What about data plane consistency?
  - Ensures each packet processed according to consistent policy.
- Do we need data plane consistency?
  - For **planned updates**: Helps with correctness during policy changes.
  - For **network events**: Adds latency before connectivity is restored.