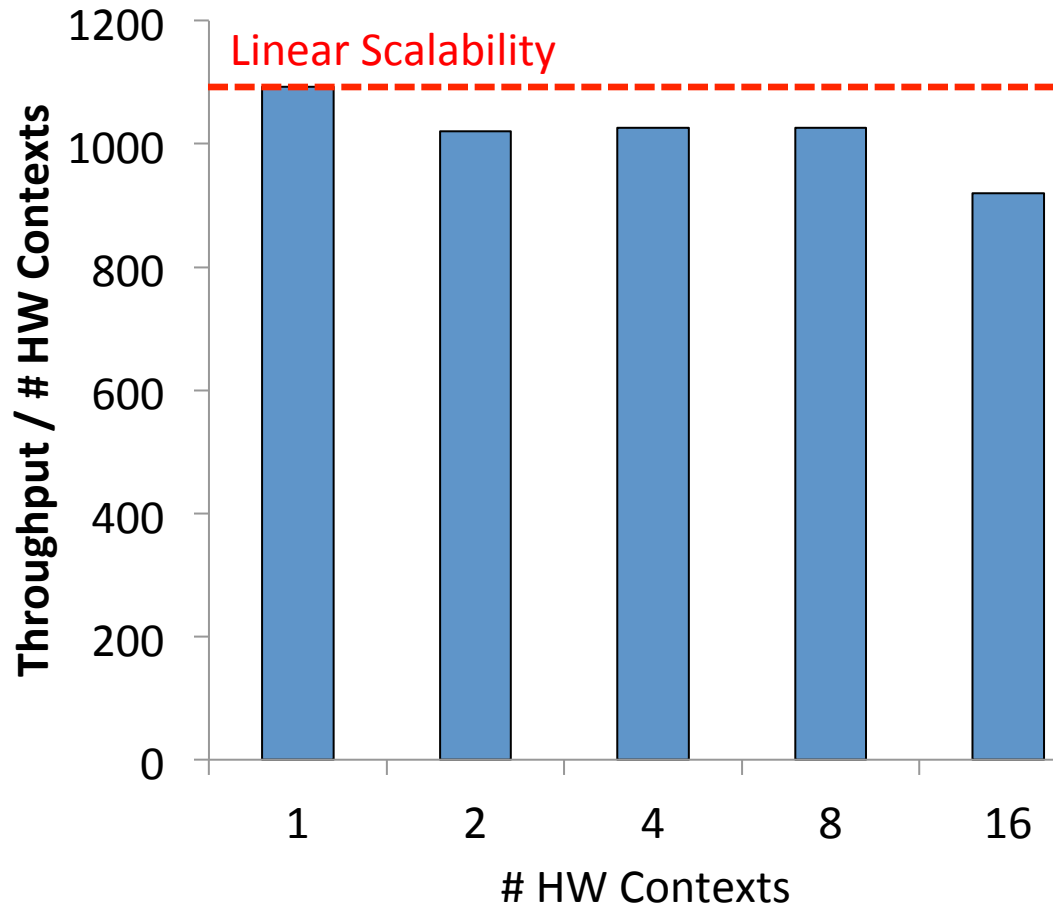# Critical Sections Through the Looking Glass

Pınar Tözün

Data Intensive Applications and Systems (DIAS)
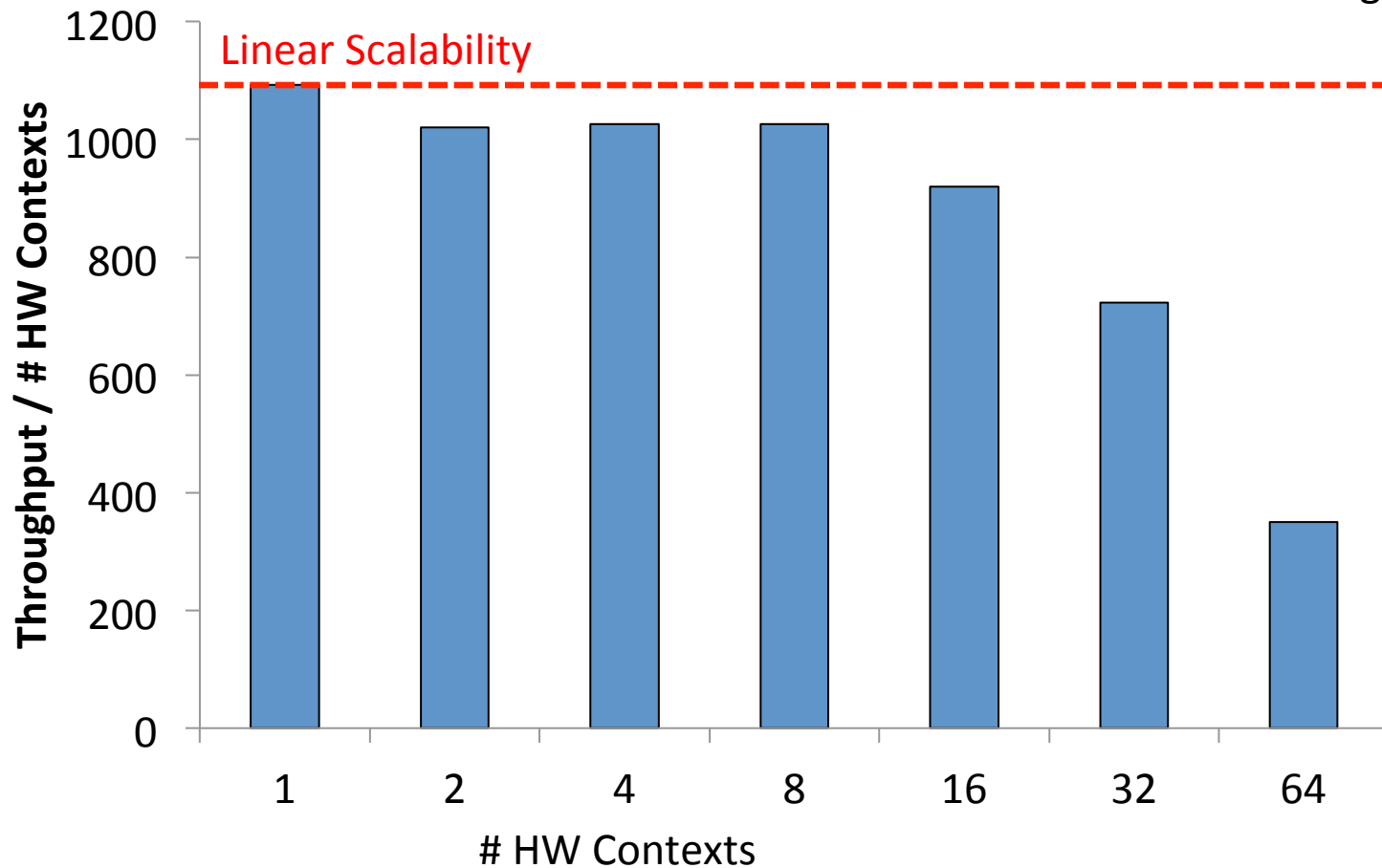École Polytechnique Fédérale de Lausanne

OLTP on Modern Hardware

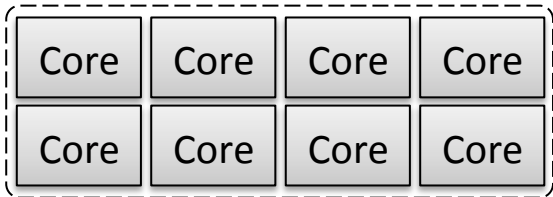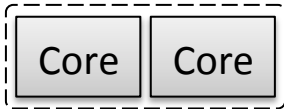TPC-C – Payment
Sun Niagara T2

OLTP on Modern Hardware

TPC-C – Payment
Sun Niagara T2
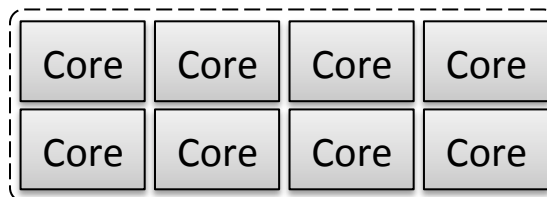

Need another metric for scalability!

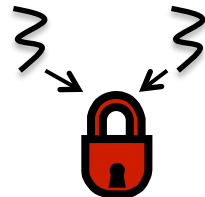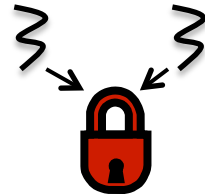# Critical Sections
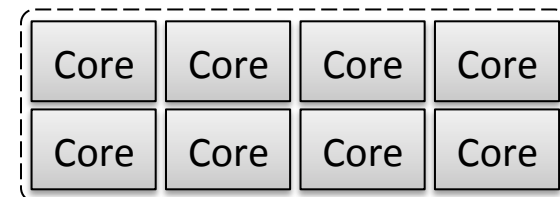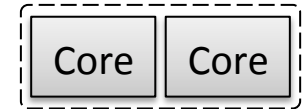
Unscalable   **Fixed**   **Composable**

Locking, Latching   Transaction Manager   Logging

Unscalable → Fixed / Composable

Road to Scalable OLTP
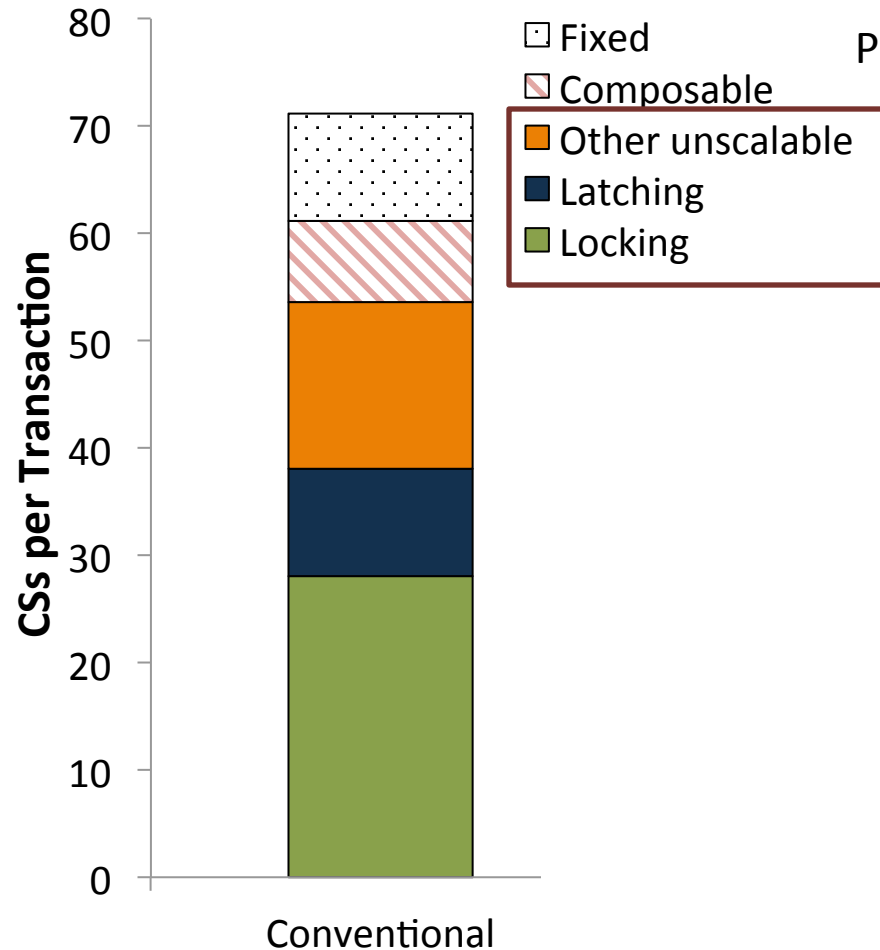
Shore-MT
Probe for one customer, update balance

Legend:
- Fixed
- Composable
- Other unscalable
- Latching
- Locking

Y-axis: CSs per Transaction (0 to 80)
X-axis: Conventional

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Road to Scalable OLTP

Shore-MT
Probe for one customer, update balance

Legend:
- Fixed
- Composable
- Other unscalable
- Latching
- Locking

Y-axis: CSs per Transaction

X-axis categories: Conventional, Logically Partitioned

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Road to Scalable OLTP

Shore-MT
Probe for one customer, update balance

Legend:
- Fixed
- Composable
- Other unscalable
- Latching
- Locking

Y-axis: CSs per Transaction (0 to 80)

X-axis categories: Conventional, Logically Partitioned, Physiologically Partitioned
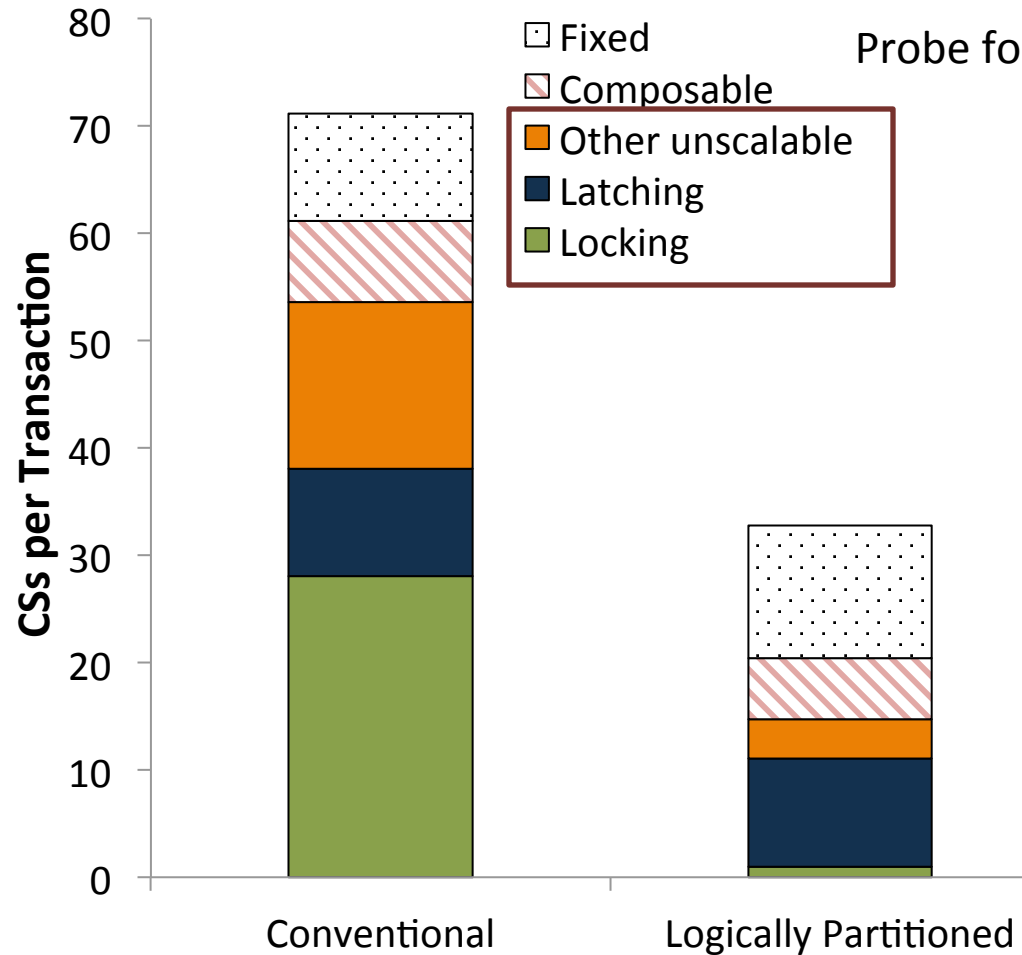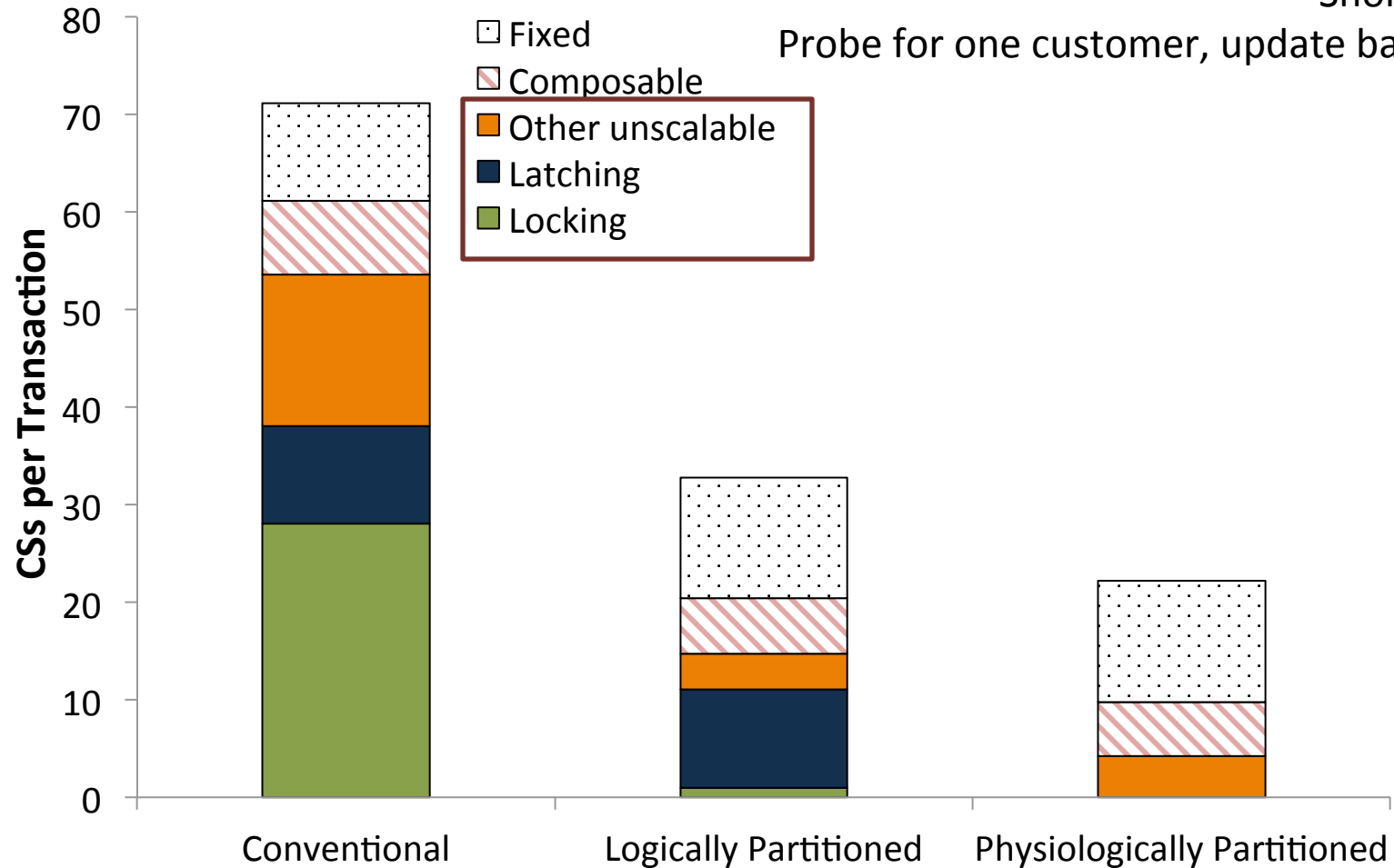
Eliminated majority of the unscalable CSs

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Conclusion

- Achieving scalability takes a lot of effort

- Multicores expose the bottlenecks of DBMSs

- Need another metric for the scalability
  - Look at your critical sections

- Scale-up as much as you can
  - Within a single node before thinking about scaling-out
  - With a shared-everything design before moving to shared-nothing