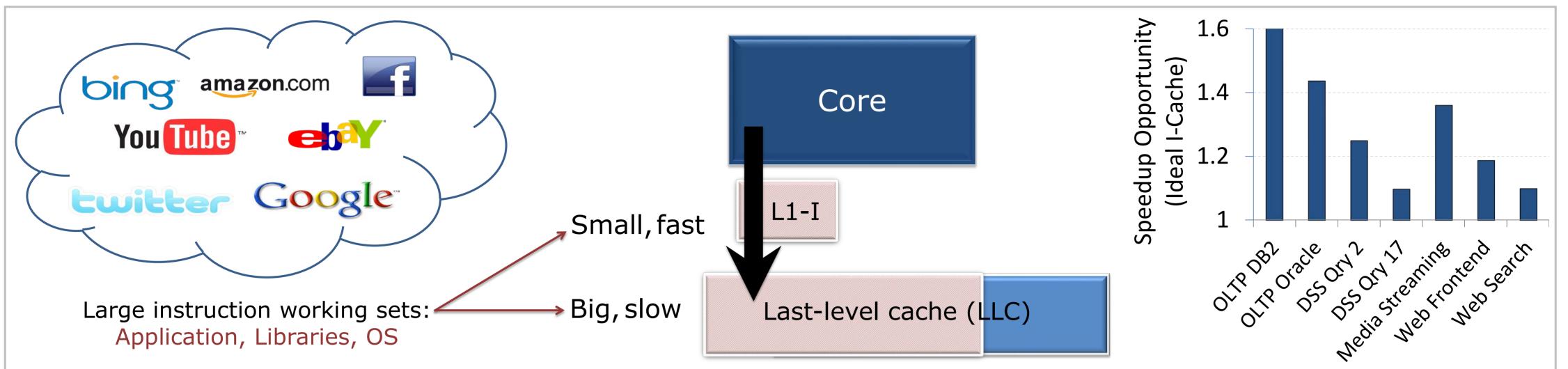


# Shared History Instruction Fetch for Lean-Core Server Processors

Cansu Kaynak EPFL

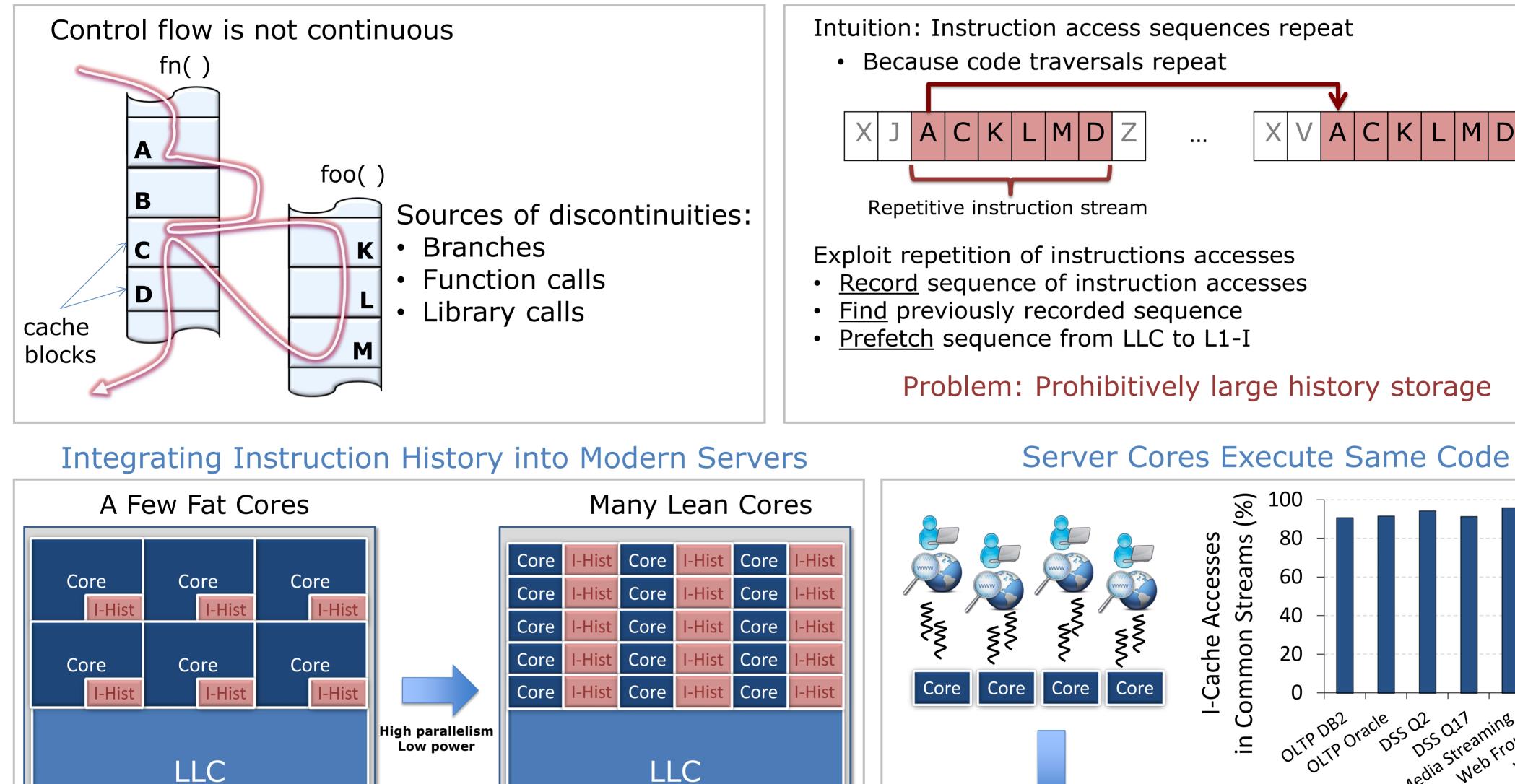
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Instruction Fetch Bottleneck in Server Workloads



## Instruction Fetch Discontinuities

## Eliminating Fetch Discontinuities



Excessive per-core instruction history size for lean cores!

Cores run same application  $\rightarrow$  Same history

90% of L1-I accesses to common sequences

Media Streaming Neb Frontend

Web Search

K L M D

## Sharing History Among Server Cores

## **Result Highlights**

#### Goal

Eliminate history replication

#### Design

• One core records, all cores replay history

#### Outcome

 Per-core history performance, at cost of one history

Shared History Instruction Fetch							
							1
n	Core	Core	Core	Core	Core	Core	
	Core	Core	Core	Core	Core	Core	
	Core	Core	Core	Core	Core	Core	
	Core	Core	Core	Core	Core	Core	
	Core	Core	Core	Core	Core	Core	
	I-Hist						
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Our Proposal:

