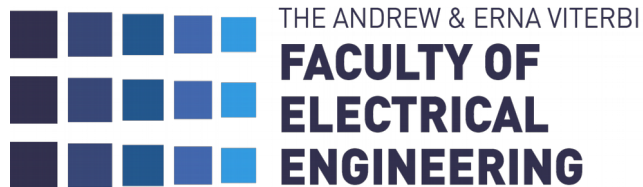
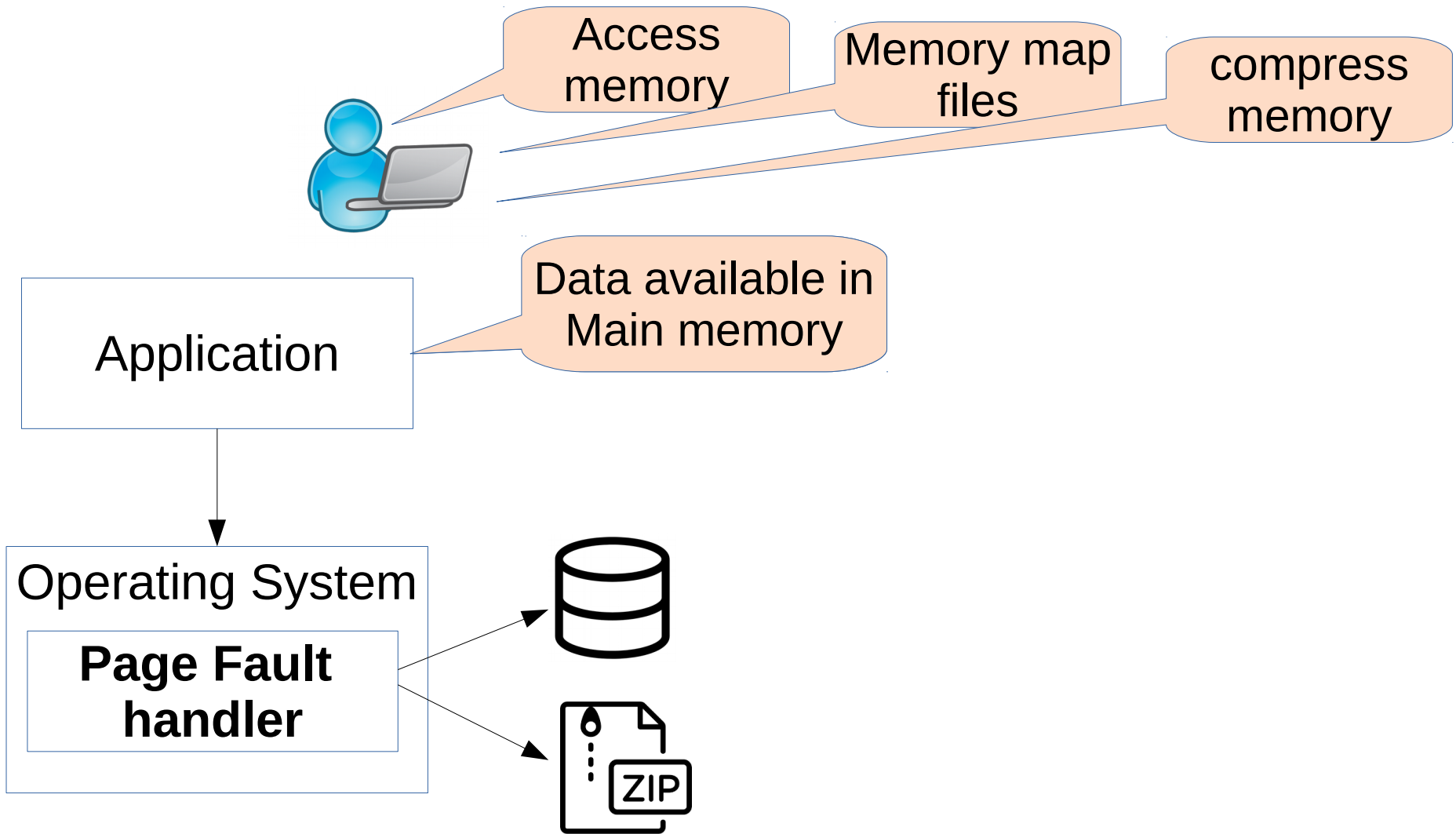


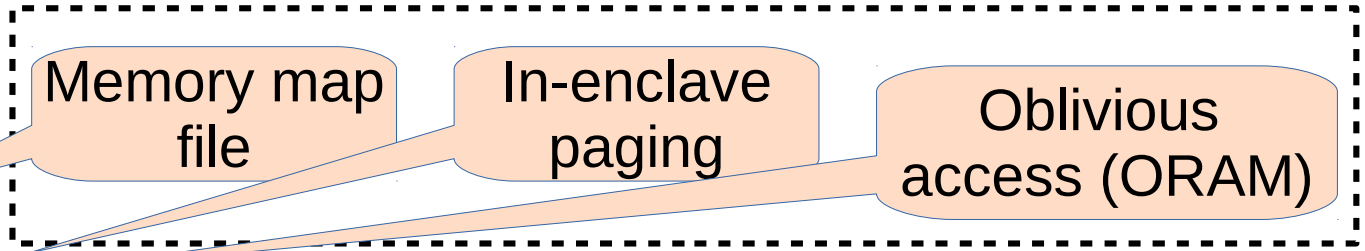
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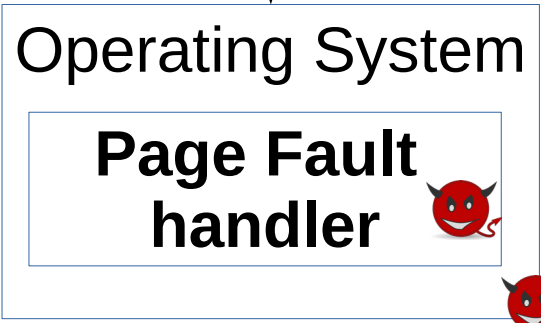


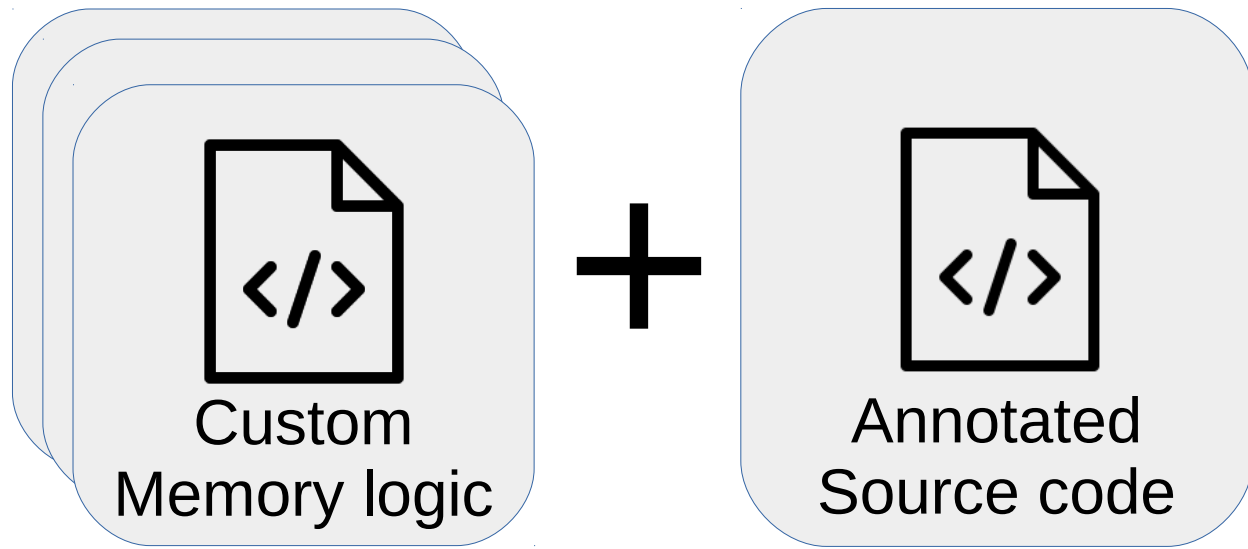
Ad-hoc solutions

Enclave



Data available in Main memory?





CoSMIX Compiler

- Challenges:
- Memory access inference
 - Low overhead
 - Selective instrumentation
 - No application code changes

Secure application with custom memory logic

Enclave

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Results:

Workload	LOC changed	Added logic	Speedup
Memcached (600MB)	1	In-enclave paging	2.2x
REDIS (600MB)	0	In-enclave paging	2x
SQLITE (60MB)	2	Secured file mapping	4.4x
Face Verification (256MB)	1	Oblivious page access (ORAM)	Mitigates page tracking attacks

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