

5min talk

WalB: Block-level WAL for Efficient Incremental Backup

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Motivation

- There is no good backup solution
 - Online
 - Small performance overhead
 - Supports various applications
 - Cost-effective
- We need
 - Consistent full backup
 - Incremental backup
 - Block-level backup
 - To use commodity hardware and free software only

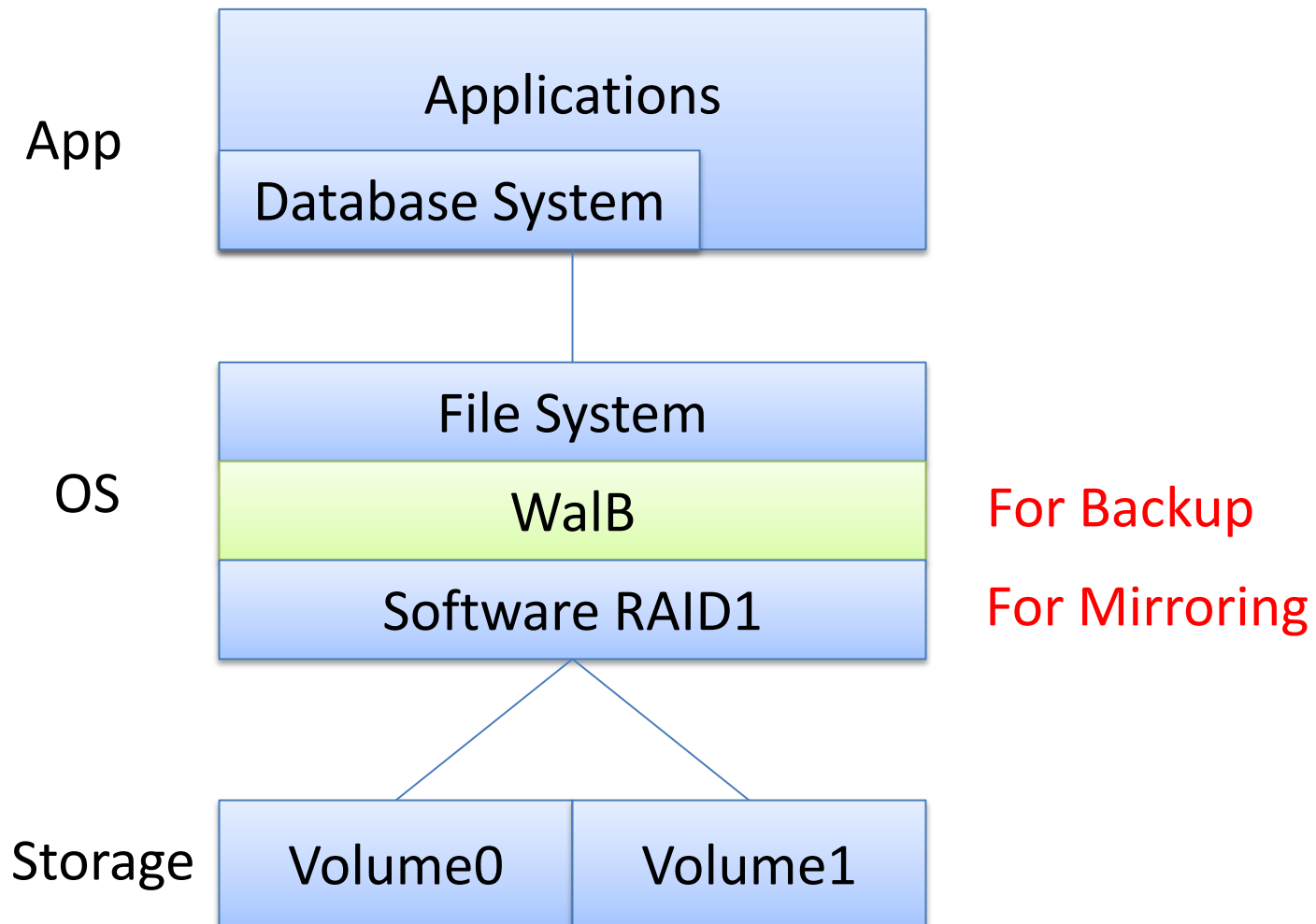
Requirements inside Cybozu

- Guarantee backup interval
 - within 5-10min
- Keep multiple backup archives
 - also in remote site
- Keep multiple snapshots
 - per 1day for 1week

WalB

- A wrapper block device driver
 - Data device to store data
 - Log device to store WAL (write-ahead log)
- Related user-land tools
 - Device controller
 - Log extractor
- Target OS and architecture
 - Latest Linux kernel (2.6.36)
 - x86_64 host

System Architecture with WalB

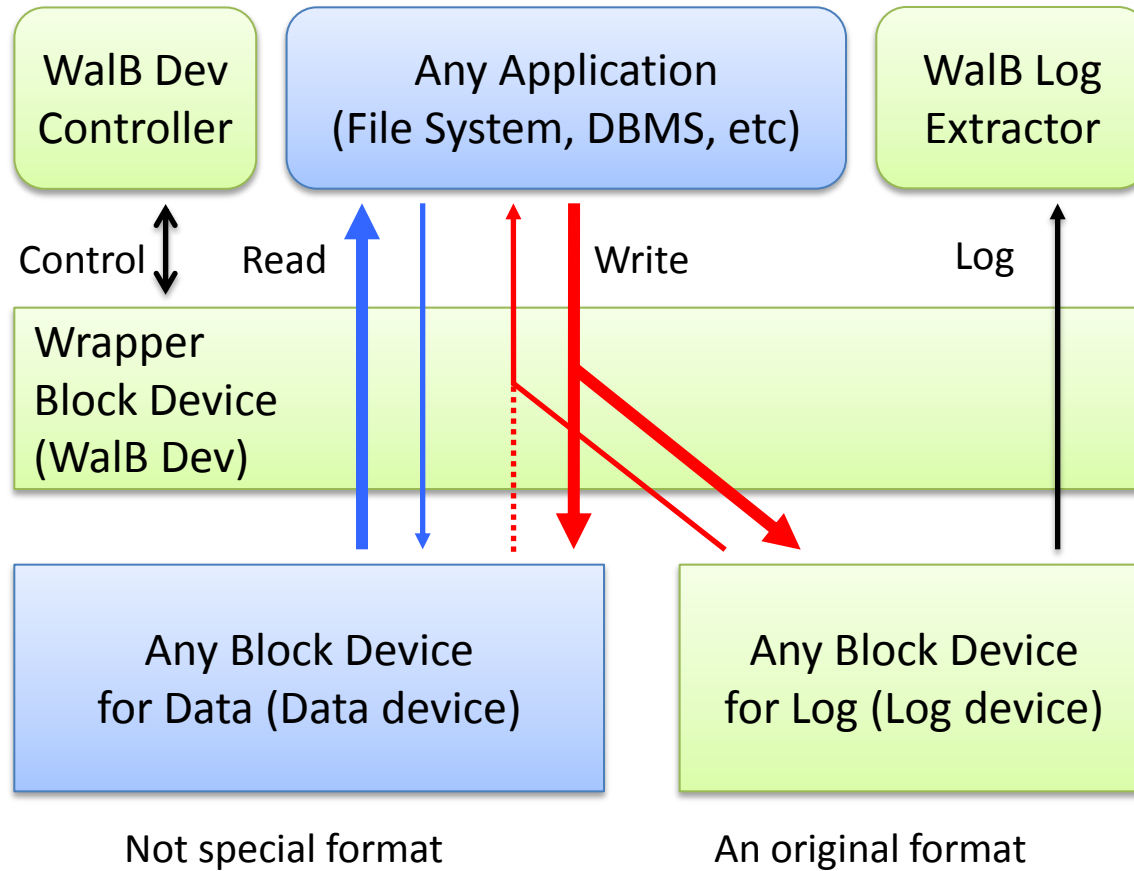


Backup vs Mirroring

	Backup	Mirroring
Typical methods	Making snapshot, Logging writes	RAID1, Replication
Recoverable failures	Operation miss, Application bug	Failure of facilities
Can keep latest data?	No	Yes

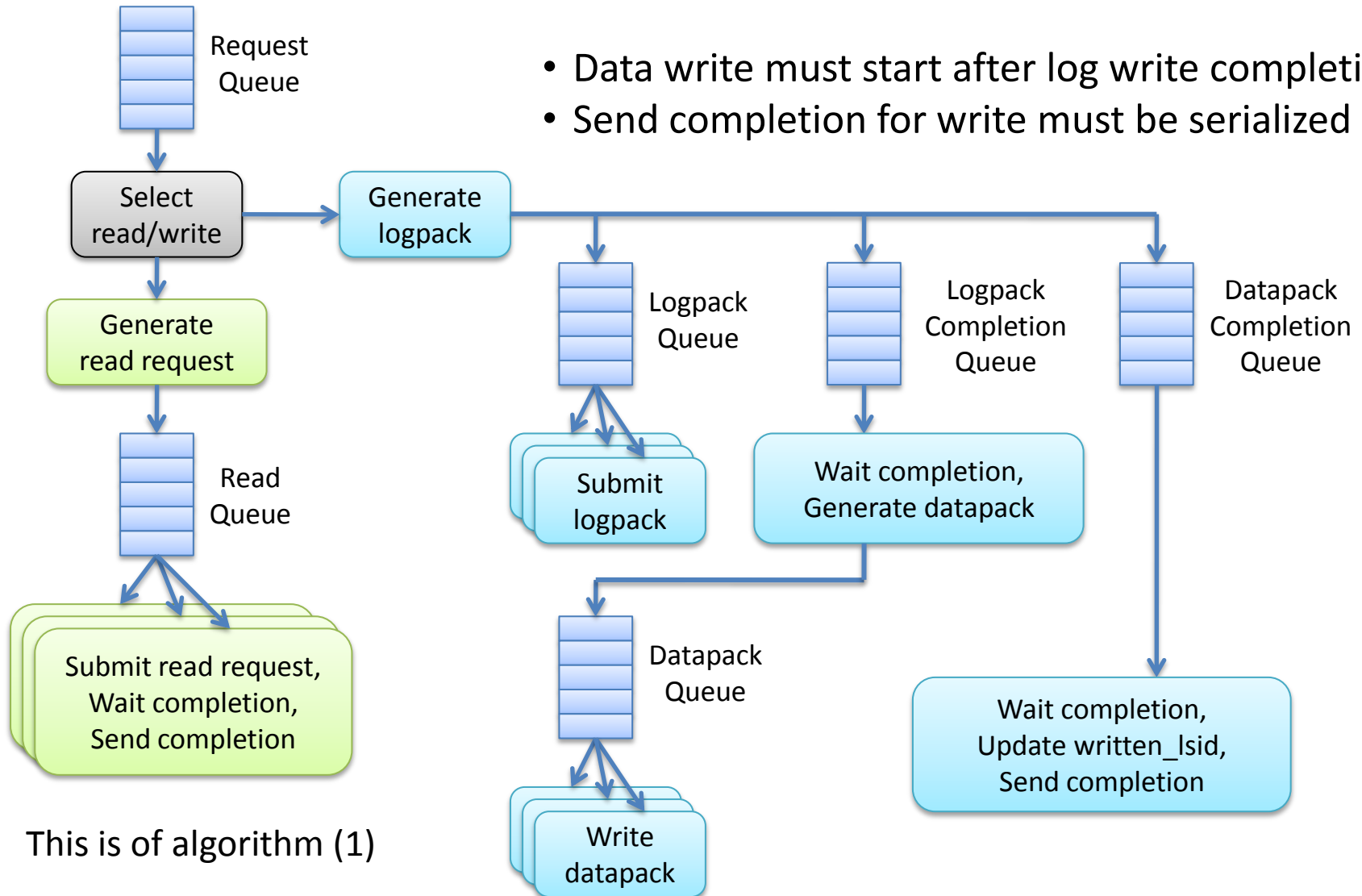
We need both functionalities to save data from lost.

WalB Architecture



Parallel Task Processing

- Data write must start after log write completion
- Send completion for write must be serialized



This is of algorithm (1)

Pros and Cons

	WalB (redo log)	Snapshot with redo log	Snapshot with undo log
Read	No overhead	Index search	Bitmap search
Write	Write twice (1)	Index modification	Bitmap search/modification and old data copy
	No overhead (2)		
Typical Soft.	---	ZFS, BtrFS	LVM

WalB + Index \sim Block device with snapshot management

Current Progress

- Survey and study linux kernel programming
 - Design of rough architecture
 - **Prototype implementation**
 - Basic evaluation and redesign if required
 - Implementation of full functionalities and test
 - Operation inside Cybozu
 - Publication as GPLv2
-
- Merging to device-mapper if required
 - Merging to main repository (hopefully)

Summary

- Motivaion
 - No good backup solution covering various applications
- WalB
 - Is a block device driver with WAL
 - Provides efficient incremental backup