

# Design for a Tag-Structured Filesystem

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# Tags

barcelona **beach** berlin **birthday** black blackandwhite blue boston **bw**  
**california** cameraphone camping **canada canon** car cat chicago  
**china christmas** church **city** clouds color **concert** cute day de dog  
england **europa** fall **family** festival film florida flower flowers  
food france **friends** fun garden geotagged germany girl girls graffiti  
green halloween hawaii hiking **holiday** home honeymoon house india ireland  
island **italy japan** july kids la lake landscape light live **london**  
macro march **me** **mexico** mountain mountains museum **music nature**  
**new newyork** newyorkcity newzealand **night nikon nyc** ocean **paris**  
park **party** people photo photos **portrait** red river rock rome san

# Tags

## Tags

- 🕒 travel [x]
- 🕒 europe [x]
- 🕒 Berlin [x]
- 🕒 Germany [x]
- 🕒 statue [x]
- 🕒 Marx [x]
- 🕒 Engels [x]
- 🕒 stranger [x]
- 🕒 sculpture [x]
- 🕒 Cold War [x]
- 🕒 top-v111 [x]

# Tags

## Explore / Tags / berlin

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### [berlin clusters](#)

Explore and refine this berlin list with our brand new clustery goodness!



From [~si](#)



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# Tagging Filesystems

- A natural application
- \$HOME for now

# Tagging FSes: Prior Work

- Bright ideas ( $\infty$ )
- FUSE or WebDAV prototypes (6)
- Other user-space tools (3)
- WinFS
- Spotlight

# Tagging FSes: Interface

- Tag Blackbird.mp3 with music, thebeatles, thewhitealbum, 1968, rock, classicrock, johnlennon, blackbird, 60s
- Listen to:
  - thebeatles
  - music & thewhitealbum
  - (rock | 60s) & !bobdylan

# Tagging FSes: POSIX

- Queries
  - `/music/thewhitealbum`
  - `/music/AND/thewhitealbum`
  - `/music+thewhitealbum`



# Tagging FSes: POSIX

- Assignments

- `mv Blackbird.mp3 /music/rock`

- `mv Blackbird.mp3 /music &&`

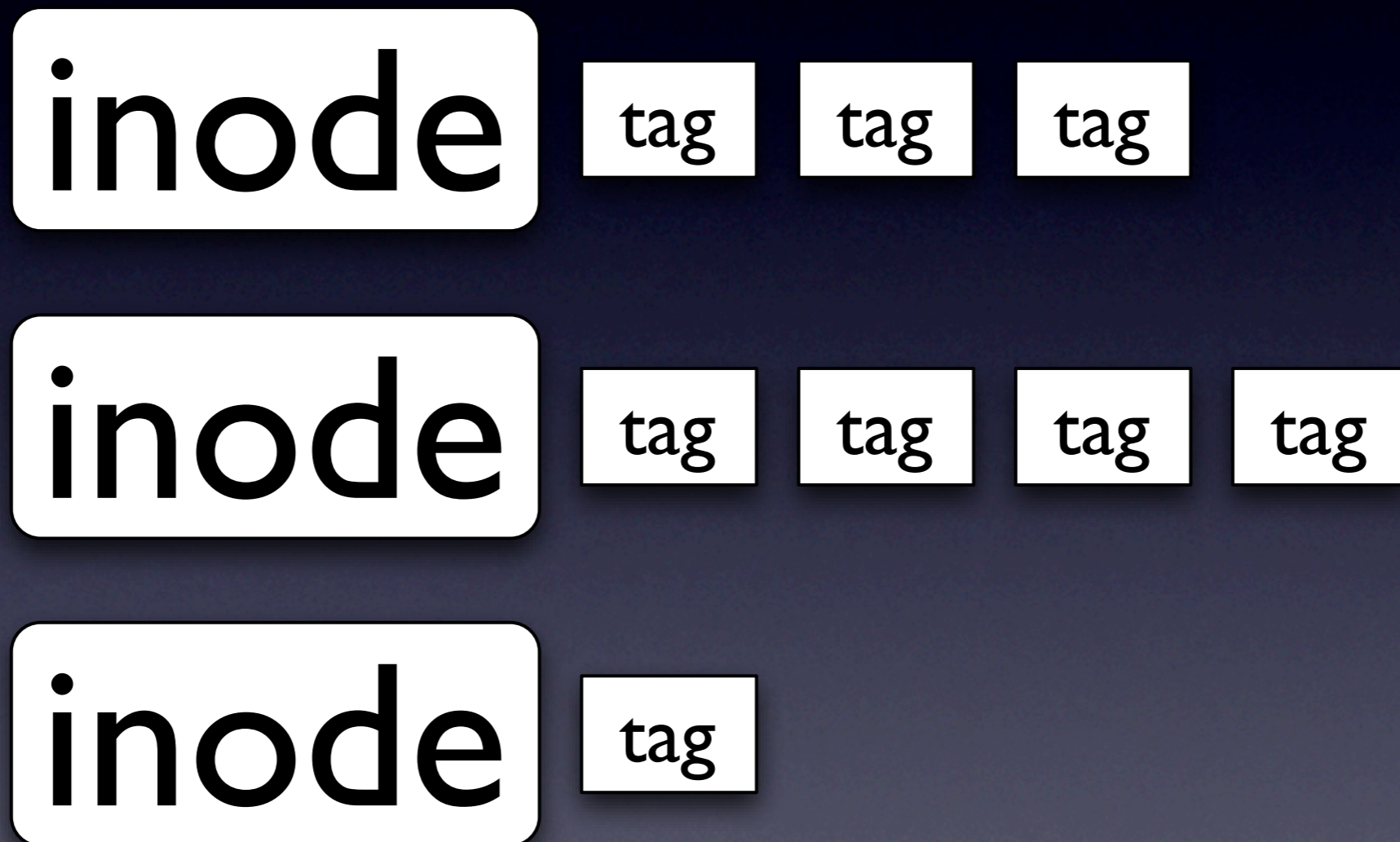
- `mv Blackbird.mp3 /rock`

# Tag-Structured Filesystems

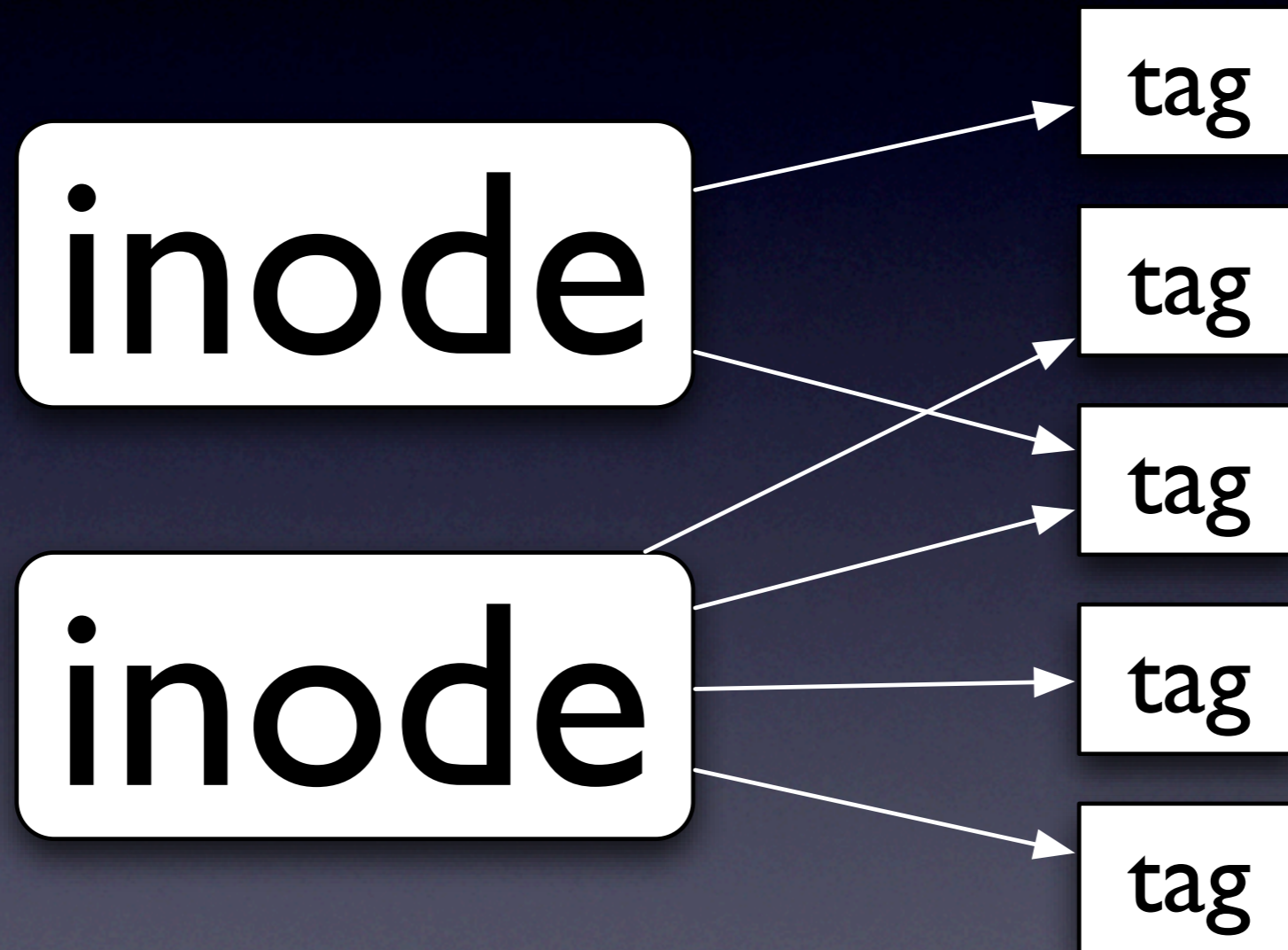
- Metadata storage
  - inode  $\rightarrow$  tags
  - tag  $\rightarrow$  inodes
- Data layout
  - single tag
  - similar tags

# TSFS: Metadata

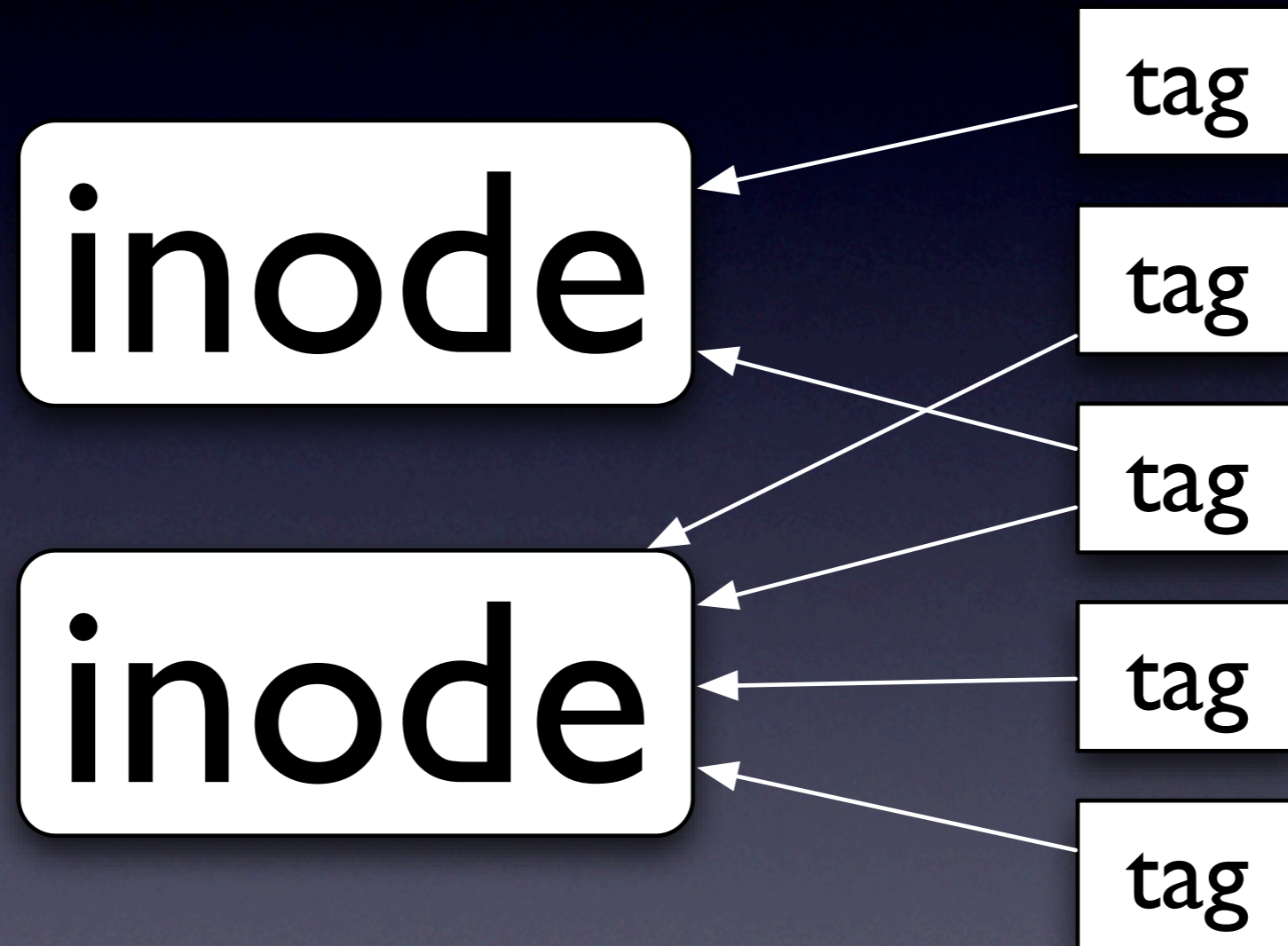
# Metadata: One Table



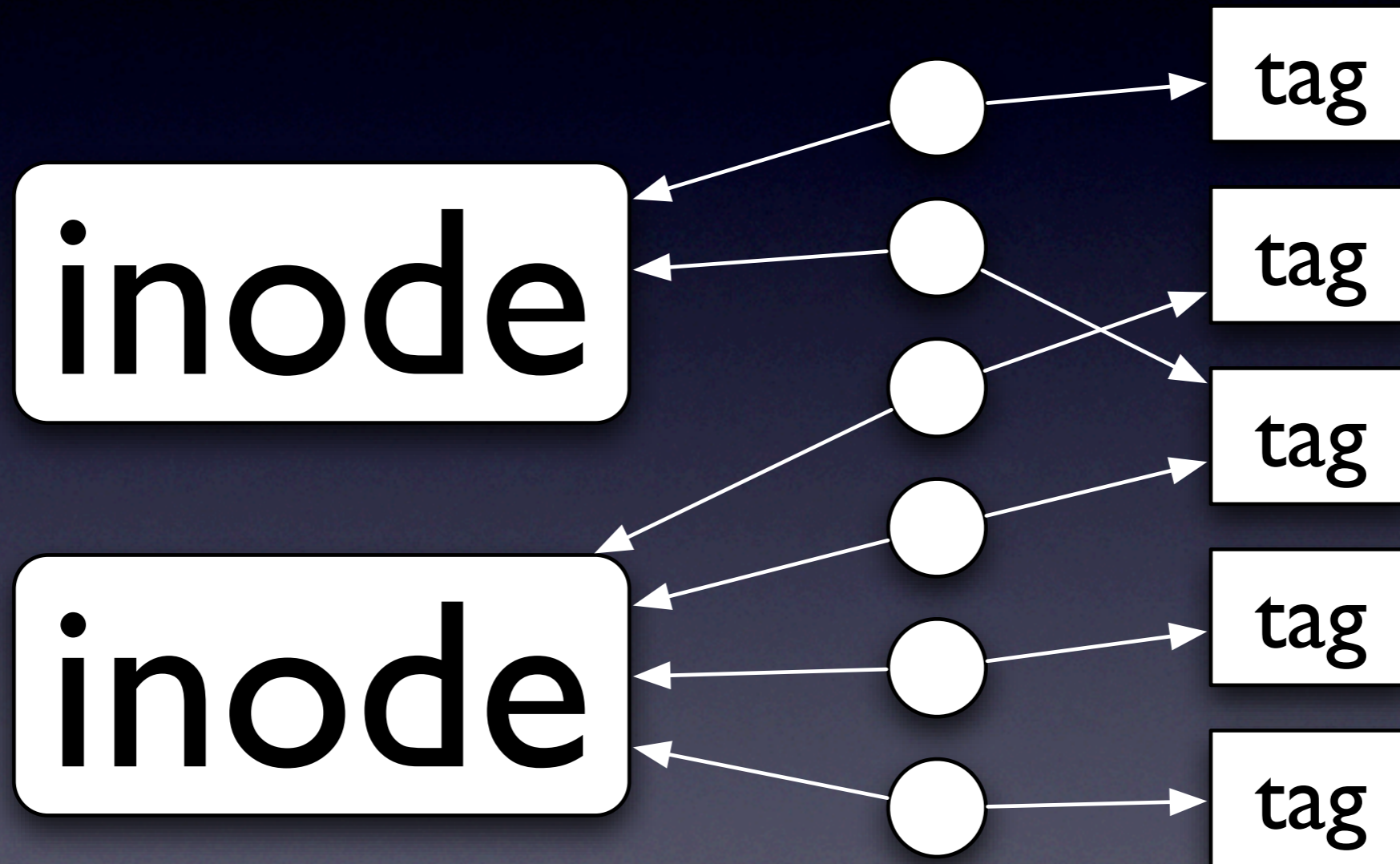
# Metadata: Two Tables



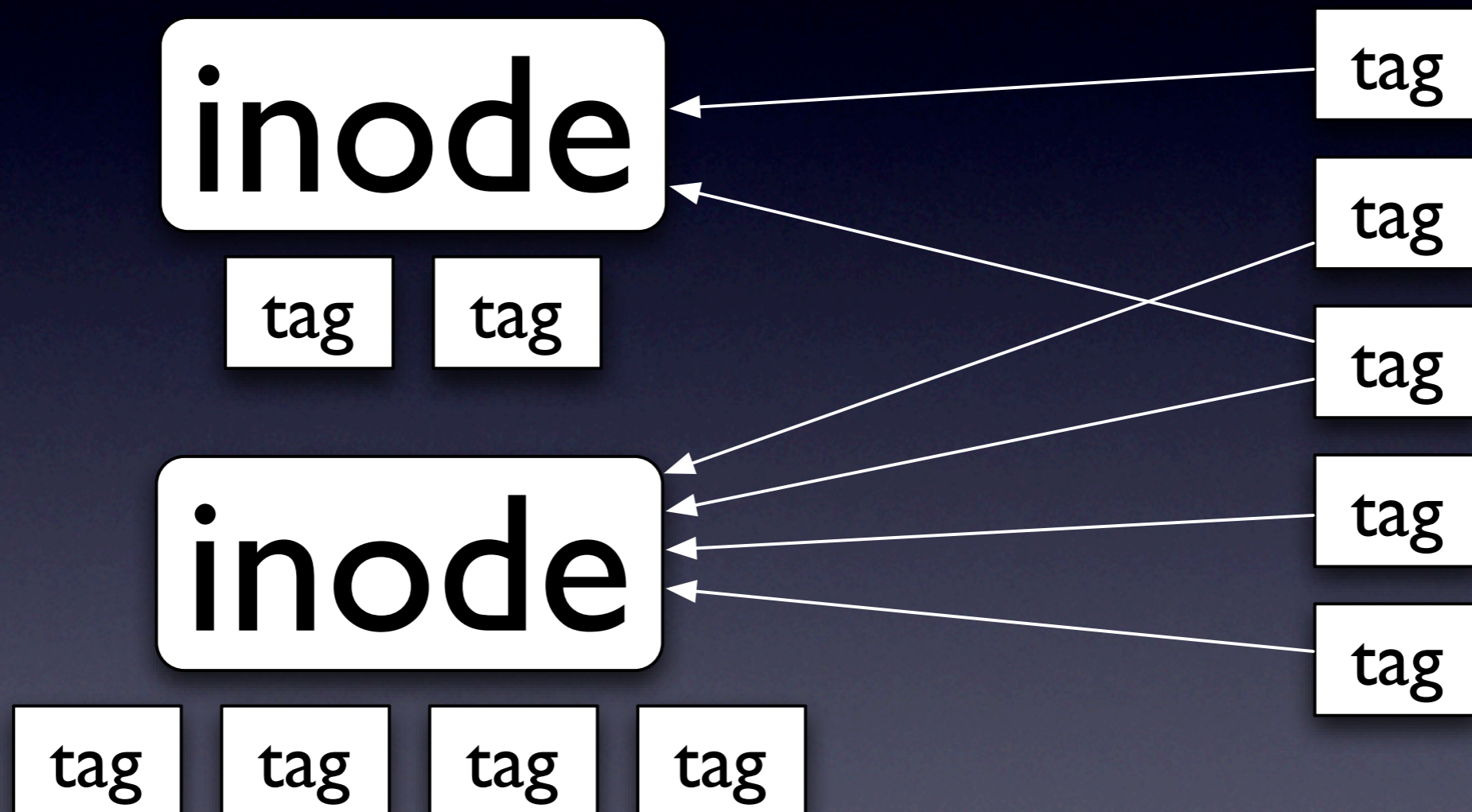
# Metadata: Two Tables



# Metadata: Three Tables



# Metadata: My Solution





# Metadata: the Tag Table

- Dynamic hash table
- B-tree

# TSFS: User Data

- FFS' cylinder groups
- Manipulating tags can be slow