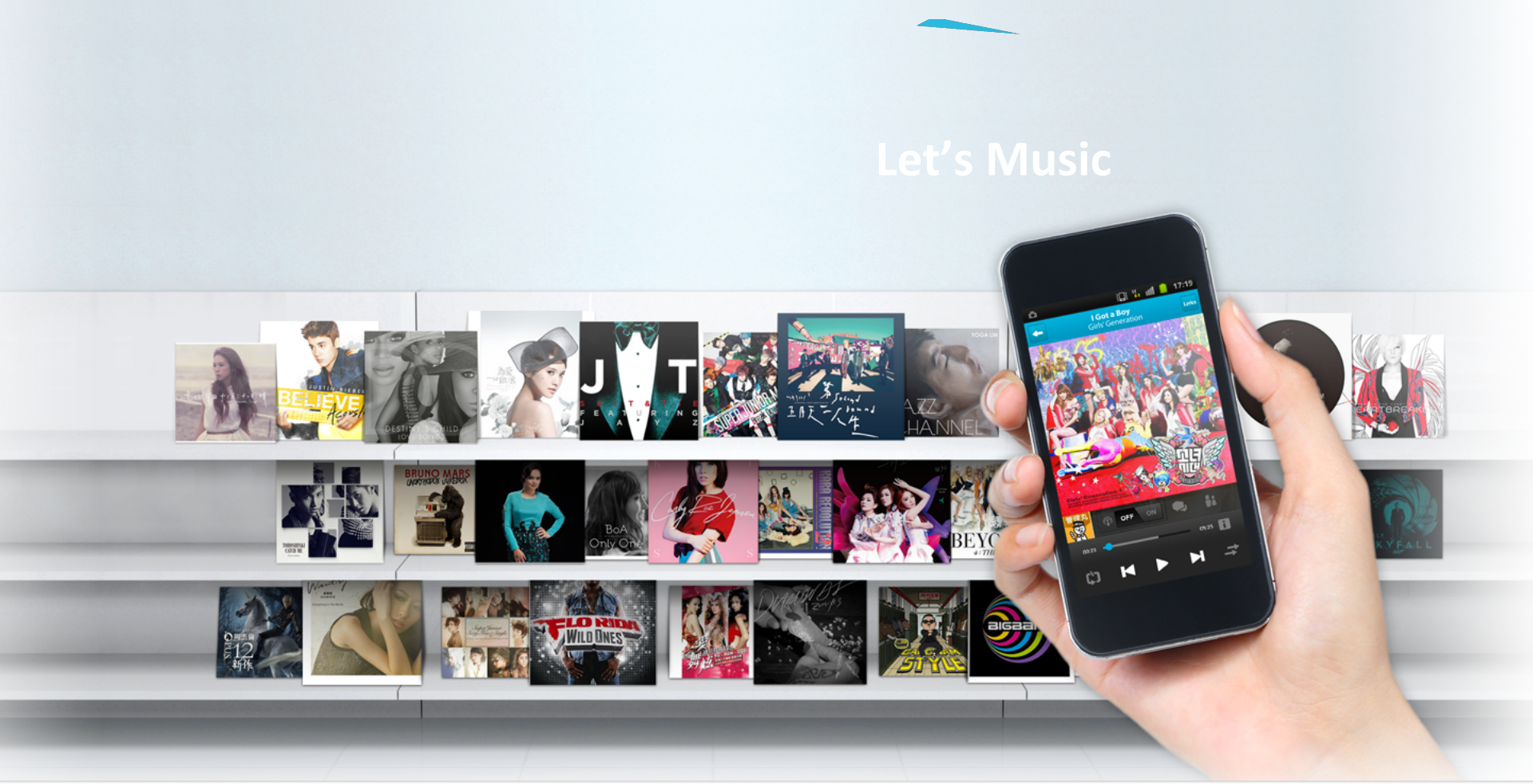


KKbox

全台灣最宅的科科科技
如何利用 MogileFS 儲存數千萬個音樂檔案

Chris Yuan
Network Administration Associate Manager

About KKBOX

About KKBOX

KKbox
香港商科科科技股份有限公司
KKBOX Technologies Limited
願境網訊股份有限公司
KKBOX TAIWAN CO.,LTD.

About KKBOX

kkbox
香港商科科技股份有限
KKBOX Technologies Limited
願境網訊股份有限公司
KKBOX TAIWAN CO

About KKBOX

COO: “KKBOX 立志成為全台灣最宅的科技公司”

About me

About Speaker

- Chris Yuan
- KKBOX Network Administration
- chrisyuan@kkbox.com
- http://chrisyuan.me

Agenda

- Why MogileFS
- MogileFS Introduction
- KKBOX MogileFS Architecture

How many songs?

Why MogileFS

公司介紹 - KKBOX

www.kkbox.com/about/tc/

KKbox

Home

關於我們 > 公司介紹

- 公司介紹
- 大事記
- 核心技術
- 投資者
- 聯絡我們
- 智財權說明
- 隱私權政策

公司介紹

KKBOX是由一群熱愛技術及音樂的工程師聯手創立的品牌，以獨創的雲端技術提供音樂串流服
只需透過網路即可播放儲存在雲端的歌曲，並以技術加密媒體檔（Digital Rights Management，
地為線上音樂和智慧財產權之間取得完美的平衡與保護，更打開了線上音樂合法授權的版權智慧
市場首度以此商業模式成為標竿品牌。至今，KKBOX擁有超過一千萬首曲目，獲得超過500家唱
授權，堪稱全球最大的華語音樂曲庫，服務地區包括台灣、香港、新加坡以及馬來西亞。KKBO
腦、智慧型手機或其他行動裝置上都能使用；不只能線上聽音樂，還能下載到電腦或手機
者一個方便自由、沒有界限的音樂世界！

KKBOX致力打造一個不受時空限制、讓人們輕鬆享受聽音樂、並與同好
訪、演唱會現場報導、娛樂新聞、樂評等豐富完整的編輯內容，KK
手、名人一起聽同一首歌曲，並與對方即時聊天，讓聽音樂變得
出了「KKBOX音樂誌」月刊，期望透過不同的媒體將音樂推向更
數位音樂風雲榜」頒獎典禮，因擁有廣大的民意基礎及公信力，更

Why MogileFS

10,000,000+ songs!

What platforms?

Why MogileFS

Why MogileFS

www.kkbox.com/tw/tc/what-is-kkbox/supported-platforms.shtml

KKbox TAIWAN

歌曲關鍵字 | 歌曲

登入 | 註冊
會員中心

音樂情報 | 音樂商店 | 專欄 | 排行榜 | 星事曆 | 討論區 | 產品下載及介紹 | 購物車 | 繳款 $ 儲值

KKBOX 介紹 > 可支援平台

最豐富完整的千萬音樂庫
隨時隨地音樂不離身
「一起聽」邊聽邊互動

查看 Windows 的完整功能 >

下載 KKBOX Windows 版

桌面版 | 行動版 | 音樂商店

iOS | Android | Windows Phone | Windows RT

Why MogileFS

- Desktop
  - Windows
  - MacOS
- Mobile
  - iOS
  - Android
  - Windows Phone
  - Windows RT

How about quality?

Why MogileFS

Why MogileFS

Best quality is AAC 320KBps

Why MogileFS

- Original audio file(from record labels)
- Service audio file(Lossy)
  - 5 formats to support different platforms and qualities

Why MogileFS

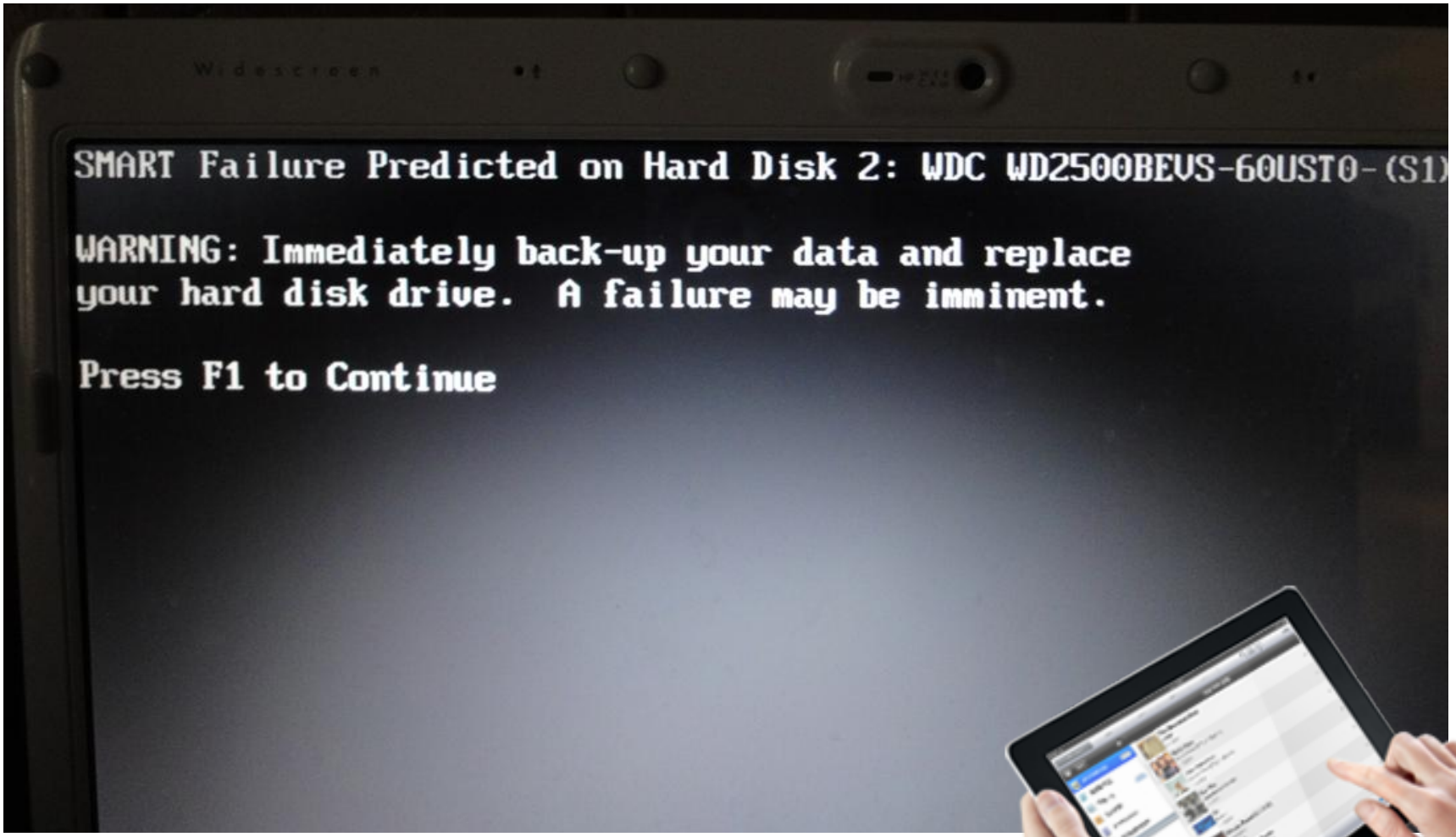
6 formats / song

Why MogileFS

- Capacity estimation
  - 100 MB/song (6 formats)
  - 10,000,000 songs
  - 100 MB x 10,000,000 = **1PB** (1,000TB)

It’s not a wonderful world!

Why MogileFS



Why MogileFS

- Data Safety
  - **3** copies / file
  - Each copy exists on different host and device
  - 1 PB x 3 = **3 PB**

MogileFS

MogileFS

- Safety
  - Every hardware will be broken someday
- Cost Saving
  - Good storage solution is very expensive (For example, NetApp)

MogileFS

- Scalability
  - Easy to add data node
- Performance
  - Distributed File System
  - The more data node, the more throughput

What is MogileFS?

MogileFS

- An open source DFS(distributed file system)
- Pronunciation: [mo`gʌl]
- API based
- Use RDBMS to store metadata
- Use HTTP(WebDAV) to transport data
- Language: Perl
- Author: Brad Fitzpatrick(Memcache, Golang, ...)

MogileFS

- Links
  - http://code.google.com/p/mogilefs
  - http://github.com/mogilefs

MogileFS

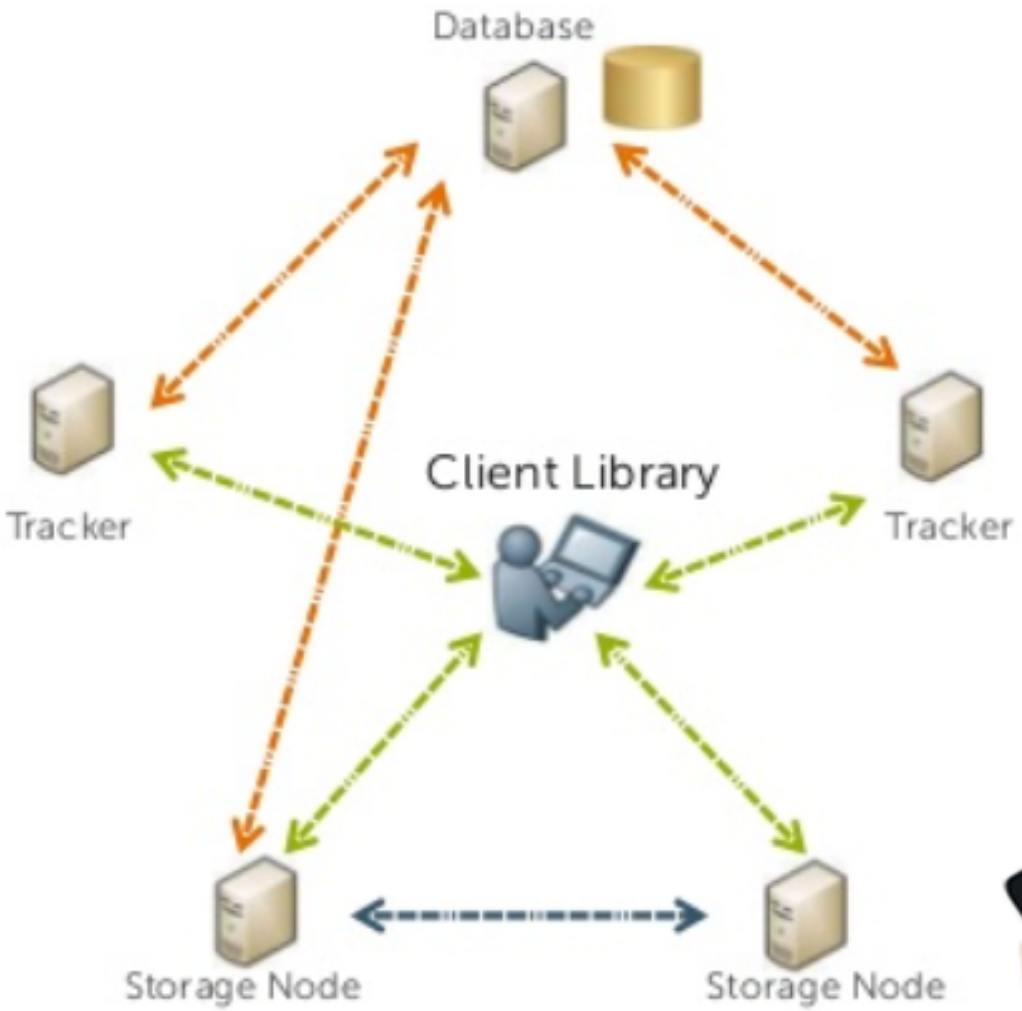
- MogileFS Architecture
  - Database

    Metadata
  - Tracker

    Query, Replicate, Delete, Fix, FSCK, Rebalance
  - Data Node

    Store Files

MogileFS


Database
Tracker
Client Library
Tracker
Storage Node
Storage Node

MogileFS

- Database
  - MySQL or PostgreSQL

MogileFS

- Database
  - Host(IP, hostname, ...)
  - Device(Device ID, on which host, ...)
  - Domain(Category)
  - Class(Level, device count)

MogileFS

- Database
  - Location of files
    - file exists on which host and device

MogileFS

- Database
  - Queues
    - Replication
    - Deletion
    - FSCK

MogileFS

- Tracker(mogilefsd)
  - Single Worker(Untunable)
    - job master(Main Thread)
    - monitor
  - Multiple Worker(Tunable)
    - replicate
    - query
    - delete
    - fsck
    - reaper

MogileFS

- Data Node
  - HTTP server with WebDAV extension
  - mogstored
  - many HDDs

KKBOX MogileFS Architecture

- Database
  - **2** Debian Linux Server
  - HA: MySQL + DRBD + Heartbeat
- Tracker
  - **2** FreeBSD server
  - **32** query worker / tracker
  - **0** replicate worker / tracker

KKBOX MogileFS Architecture

- Data Node
  - Intel E5-2420 x 2
  - 16G RAM
  - WD Red **3**TB HDD x **24**

KKBOX MogileFS Architecture

- Data Node
  - **50+** Nodes

KKBOX MogileFS Architecture

- Data Node
  - **2** replicate worker
  - **2** delete worker
  - **1** query worker
  - device count is **3**

KKBOX MogileFS Architecture

- Data Node
  - Nginx with WebDAV extension
  - Data nodes share a 10G uplink
  - Each data node has 2G uplink
  - Theoretically, throughput is 30+ GBps

KKBOX MogileFS Architecture

- HDD

KKBOX MogileFS Architecture

- Capacity
  - A Data Node

    2,793 GB x 23 = 64,239 GB (62.7TB)

KKBOX MogileFS Architecture

- Capacity
  - How many nodes to achieve 3 PB?

    62.7 TB x 48 = 3009.6 TB

KKBOX MogileFS Architecture

- Capacity
  - Storage cost(HDDs only)

    NTD 4,500 x 48 x 24 = NTD 5,184,000

KKBOX MogileFS Architecture

- Capacity
  - Weight

    0.635 KG x 48 x 24 = 731.25 KG

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Thank You