Shared Parallel File System

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Shared Parallel File System

- Introduction of the project
- The PVFS2 parallel file system
- The GFS cluster file system
- Comparison of PVFS2 and GFS
- Project conclusion and future outlook

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Introduction of the project

- Parallel file system
  - Industrial standard commodity PCs
  - NFS (Network File System)
  - Many new shared file systems available: PVFS2, GFS, …
- The goal of the project
  - Test PVFS and GFS file system on the test nodes and generate a recommendation report

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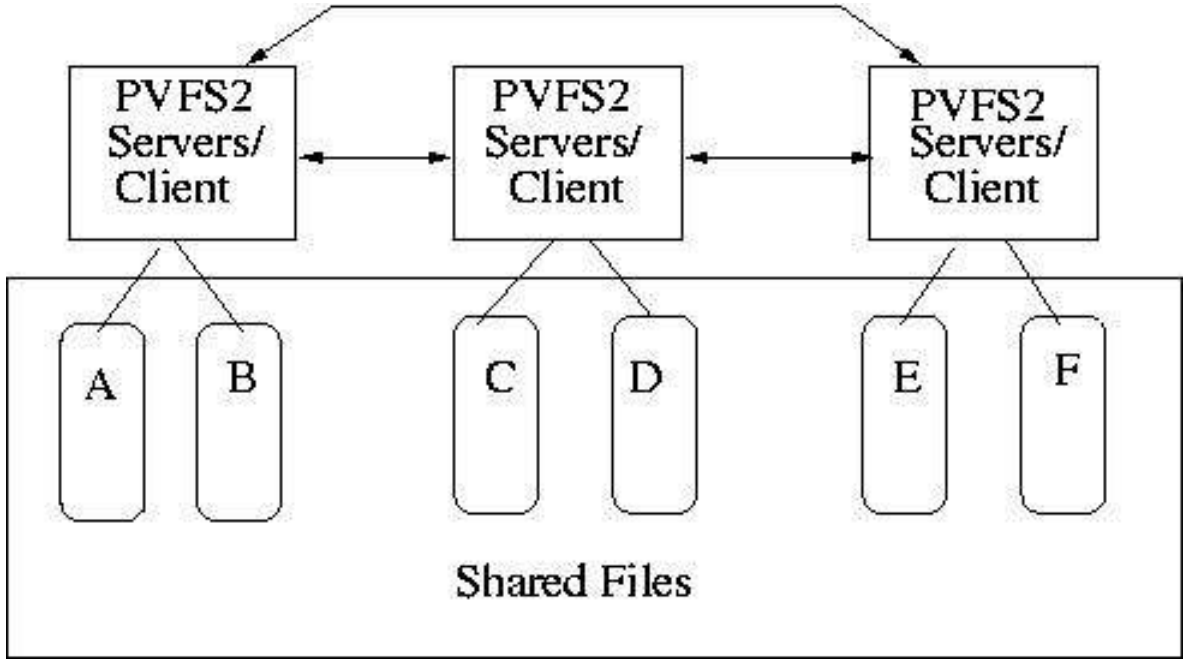
The PVFS2 parallel file system

- What is PVFS2 file system
  - Parallel Virtual File System 2
  - A remote storage server management system
- Internal organization
  - Servers and clients
  - Data storage organization
  - Two types of interfaces

The PVFS2 parallel file system



The PVFS2 parallel file system

- Features supplied by PVFS2 file system
  - Few dependencies
  - Multiple interfaces supported
  - Modular design
  - Distributed data storage
- Deployment of PVFS2 file system
  - Generate the configuration file
  - Start up the servers

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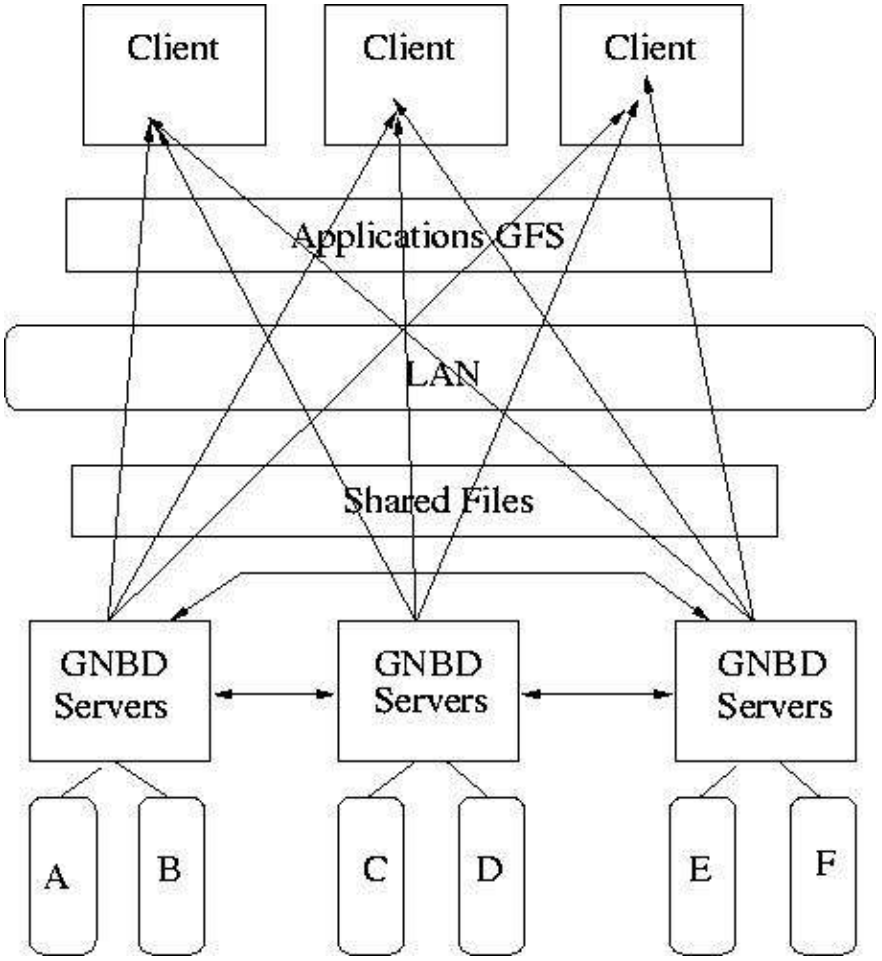
The GFS cluster file system

- Introduction of GFS file system
  - Managed by Red Hat Cluster Suite
  - Supplies a uniform view among cluster nodes
  - Load distribution and balancing
  - Installed directly on SAN or by GNBD devices
  - Built up with Logical Volumes created by Cluster Logical Volume Manager

The GFS cluster file system



The GFS cluster file system

- Deployment of GFS file system
  1. Forming a cluster domain through cluster configuration tools
  2. Forming a fencing domain through fence daemon
  3. Export/Import GNBD device
  4. Starting Cluster LVM daemon
  5. Mount the GFS file system

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Comparison of PVFS2 and GFS

- Work theory
  - Servers and Clients management
  - Storage management
  - System consistency supports
  - Robust and scalability

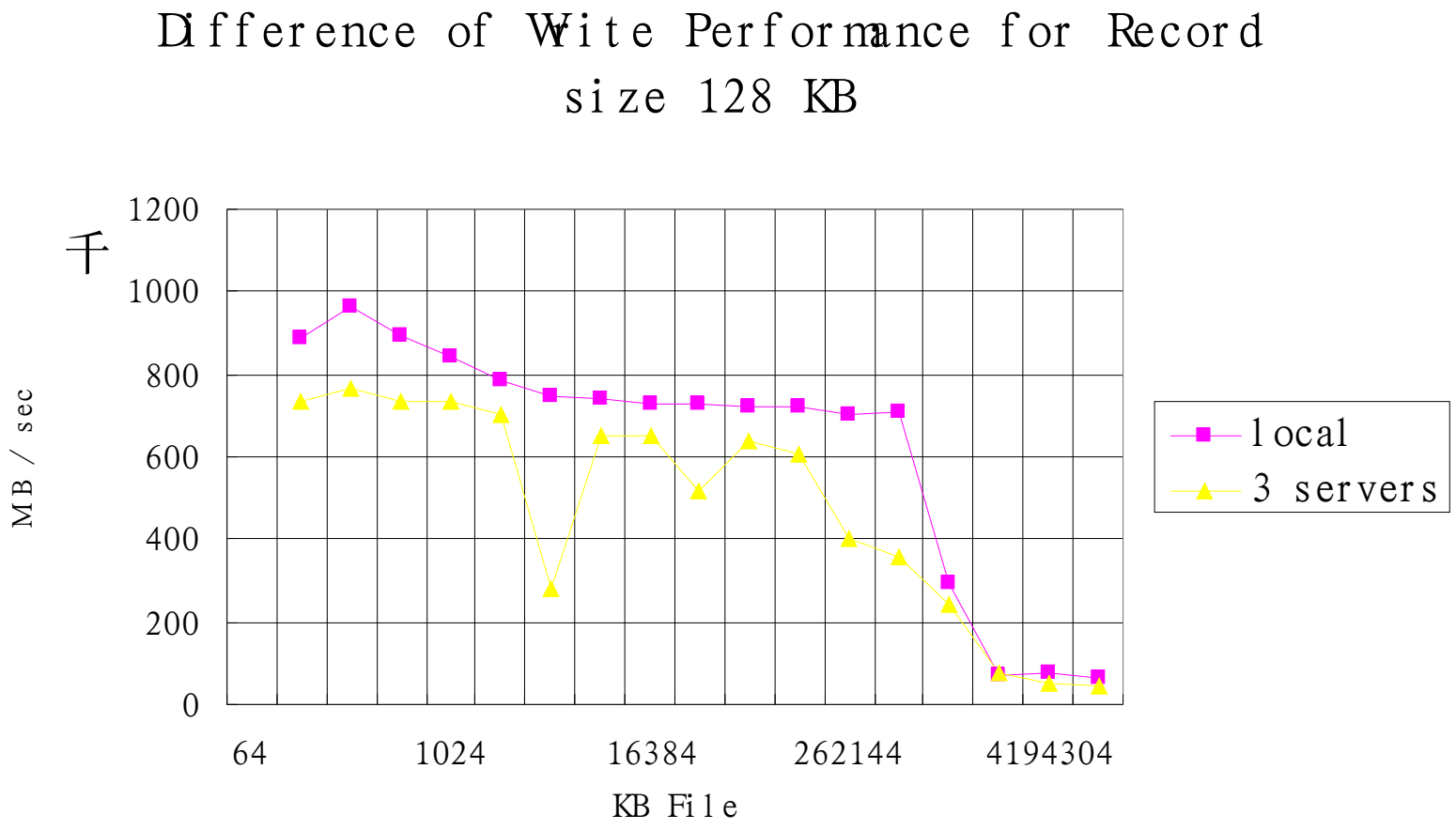
Comparison of PVFS2 and GFS

- Test of performance
  - Test conditions:
    - 4 test nodes:
      - CPU: Intel® Xeon™ CPU 3.40 GHz
      - Cache: 1024 KB
      - Memory: 2075884 KB
    - Organizations:
      - 2 servers - 2 clients
      - 3 servers – 1 clients
    - Network connection: Gigabit Ethernet

Comparison of PVFS2 and GFS

- Test of performance
  - Test sets: Write, ReWrite, Read, ReRead
  - Throughput test: multiple processes concurrent operations
  - Test programme: IOZONE
    - With options:
      - -A Automatic, all the file size (64 KB, …) and block size (4KB, …)
      - -t # Throughput test with # process for alternative operations (write, read, …, random write, …)

Comparison of PVFS2 and GFS



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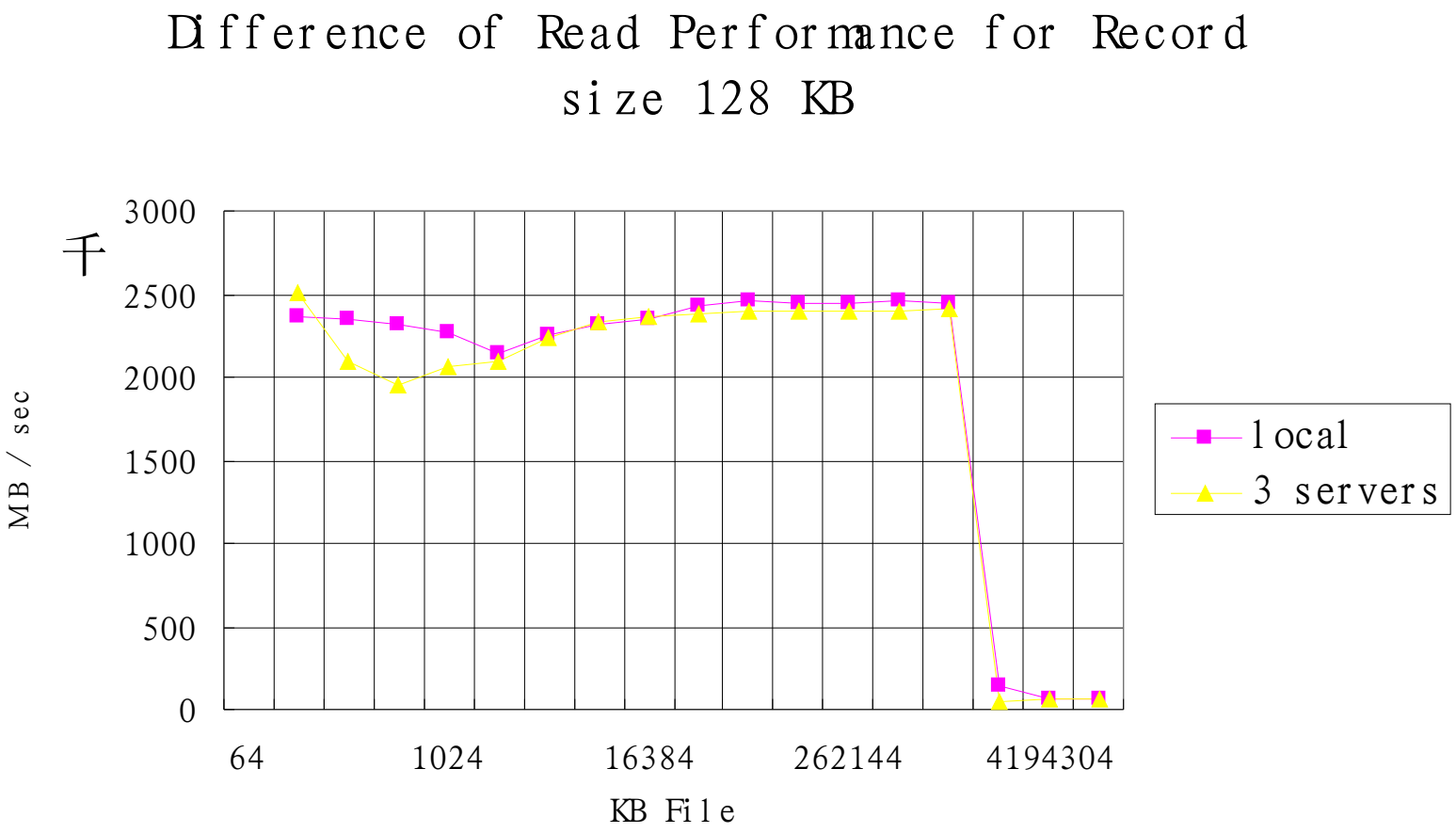

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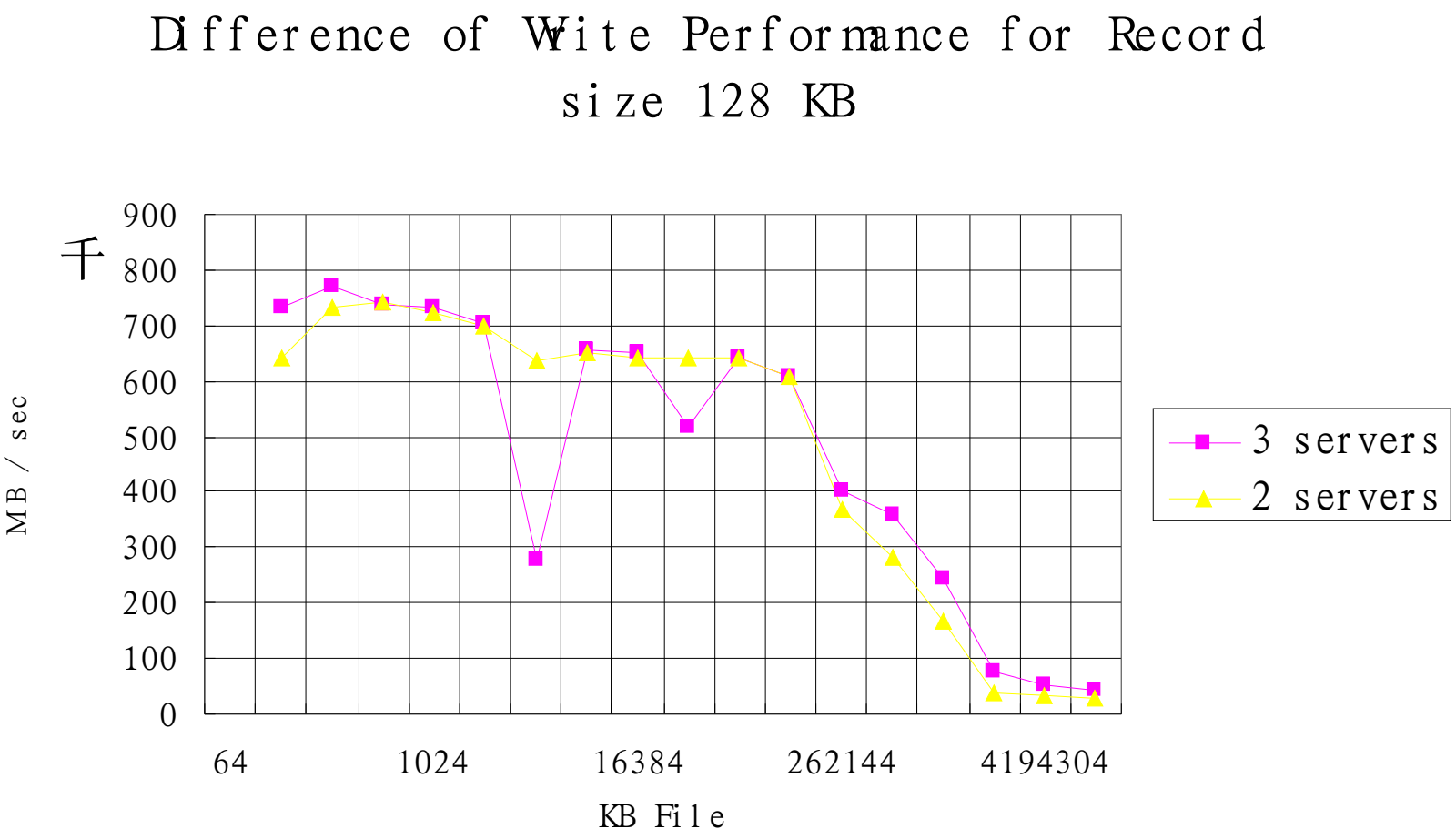

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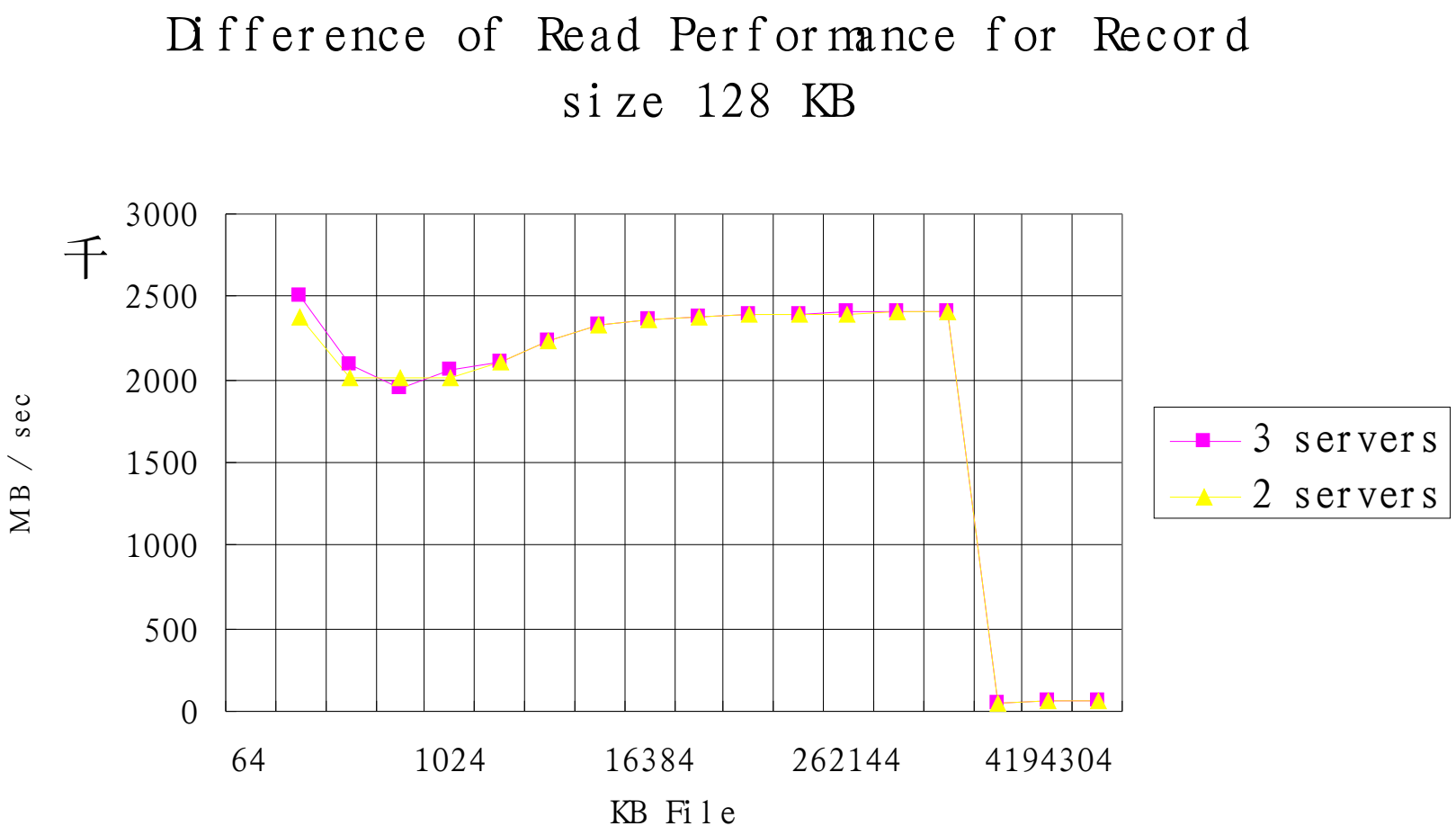

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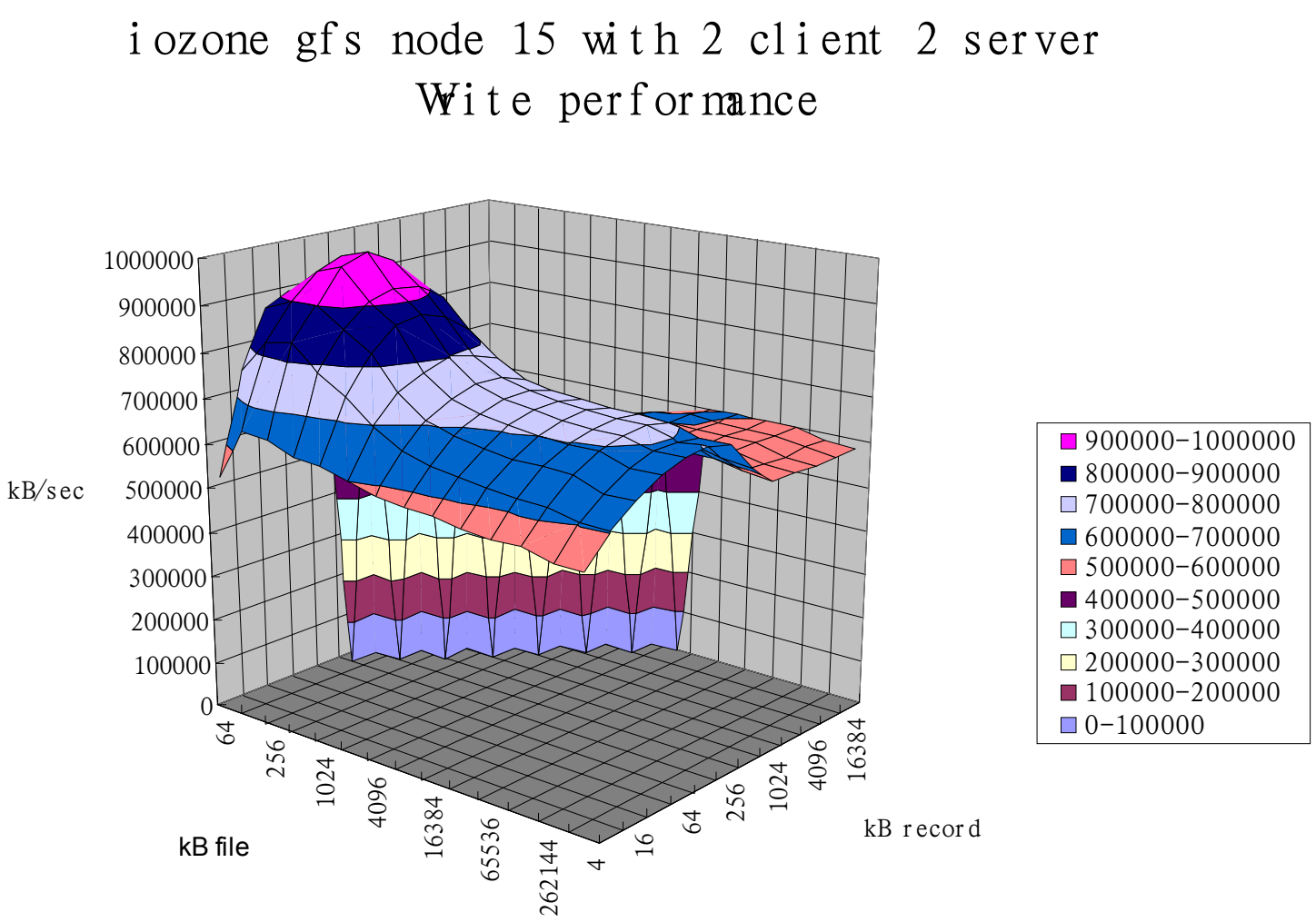

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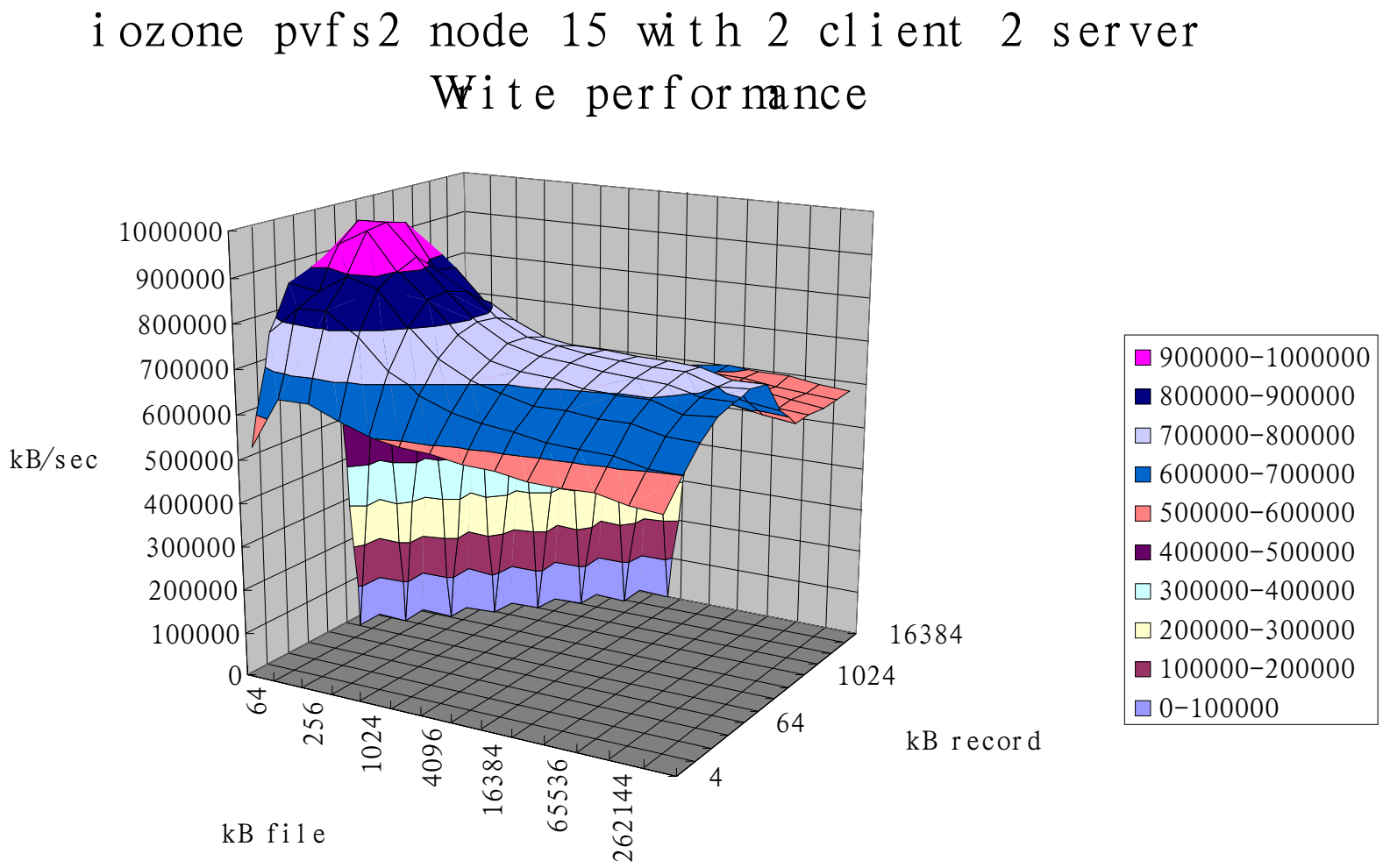

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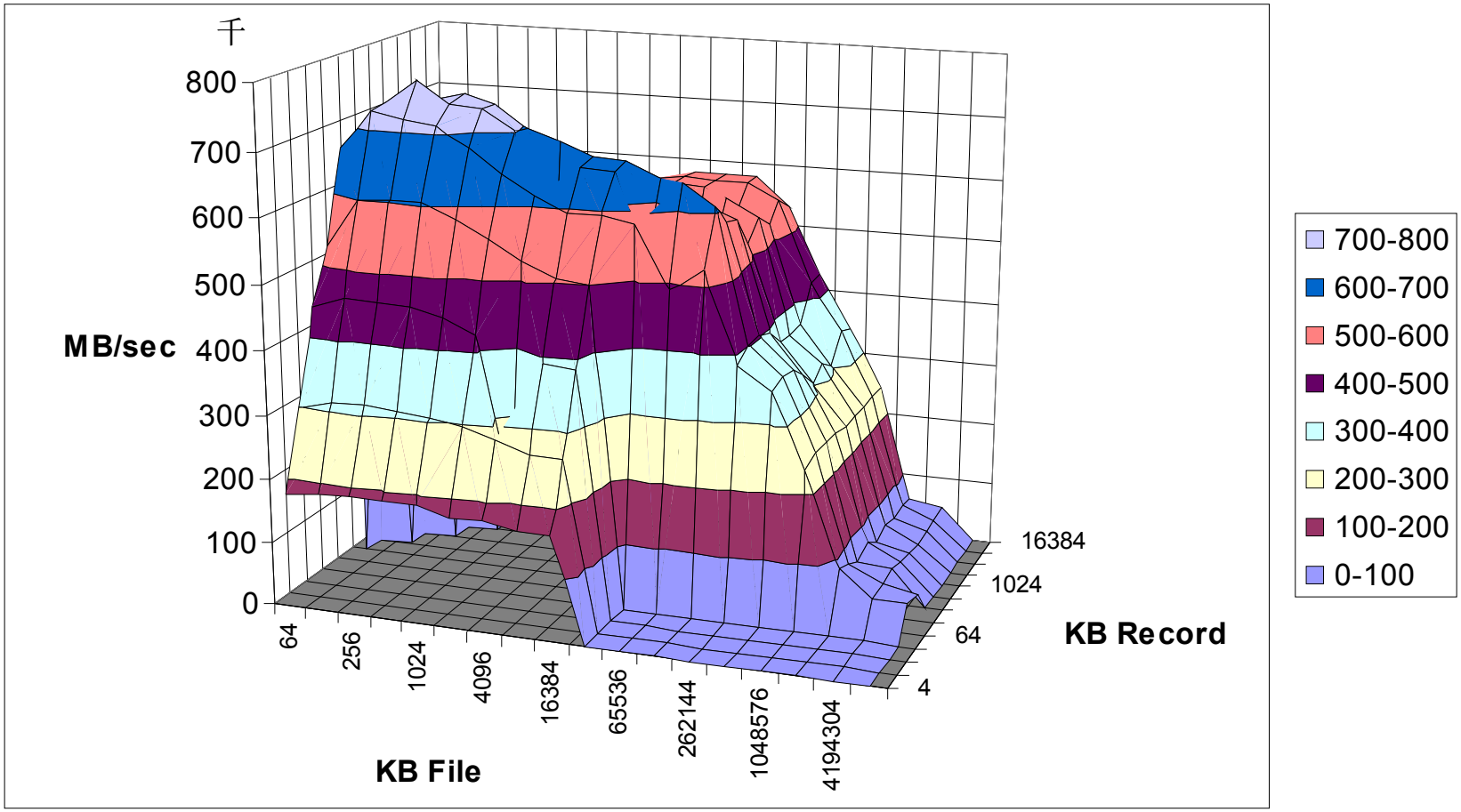

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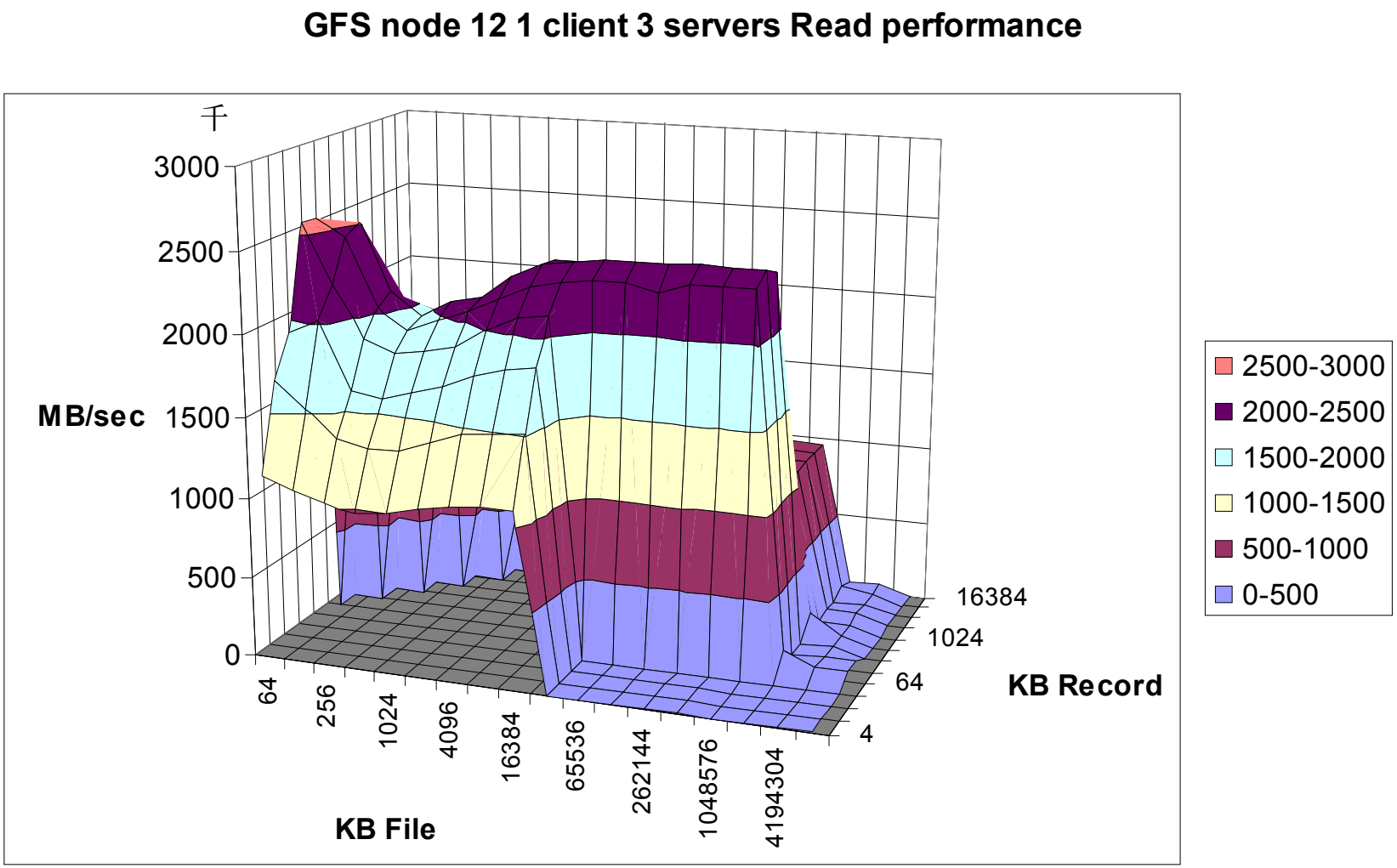

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Project conclusion and future outlook

- The PVFS2 file system
  - A popular parallel file system
  - Stable performance
  - Multiple possibilities
  - User level stripping
  - Ease installation
- The GFS file system
  - A reliable package
  - Robust and scalability
  - Multiple configuration forms
- Future outlook
  - PVFS2 more chances

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Questions?

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Thank you so much for your help!