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# An On-line Backup Function

# for a Clustered NAS System (X-NAS)

## Yoshiko Yasuda

## Central Research Laboratory, Hitachi, Ltd.

**NASA/IEEE MSST 2004**
12th NASA Goddard/21st IEEE Conference on
Mass Storage Systems & Technologies
The Inn and Conference Center
University of Maryland University College
Adelphi MD USA
April 13-16, 2004

IEEE
COMPUTER
SOCIETY

# 1. Background and Goals

■ **Entry-level NAS has many advantages:**

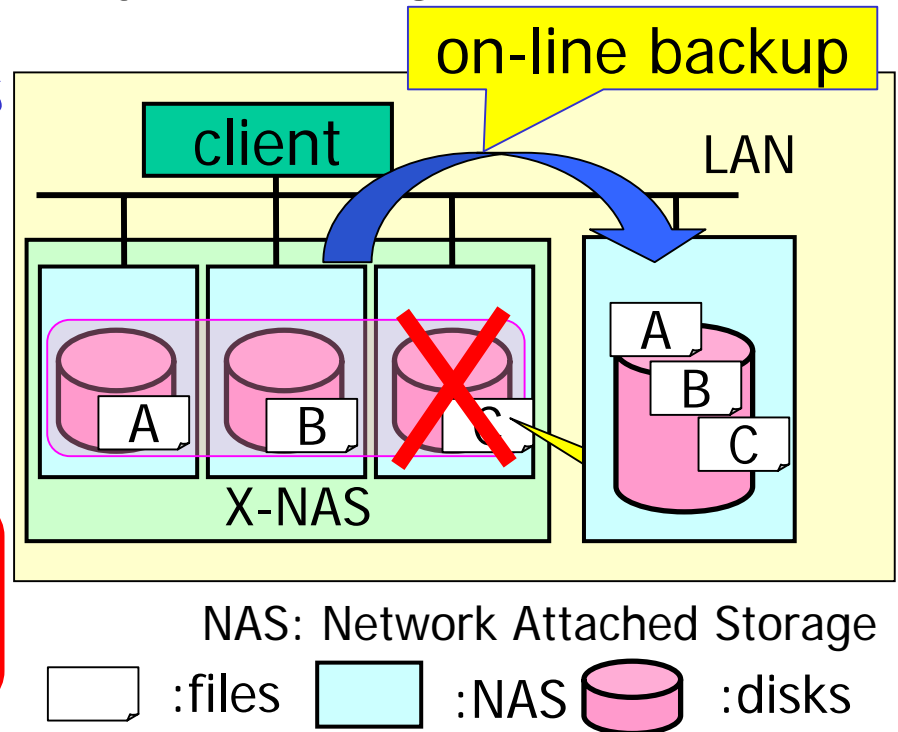low cost, easy to use, easy to manage

■ **Disadvantages and goals**

● Not scalable

➡ Clustered NAS system
X-NAS (eXpandable NAS)

● Not reliable

**On-line backup function
for X-NAS**
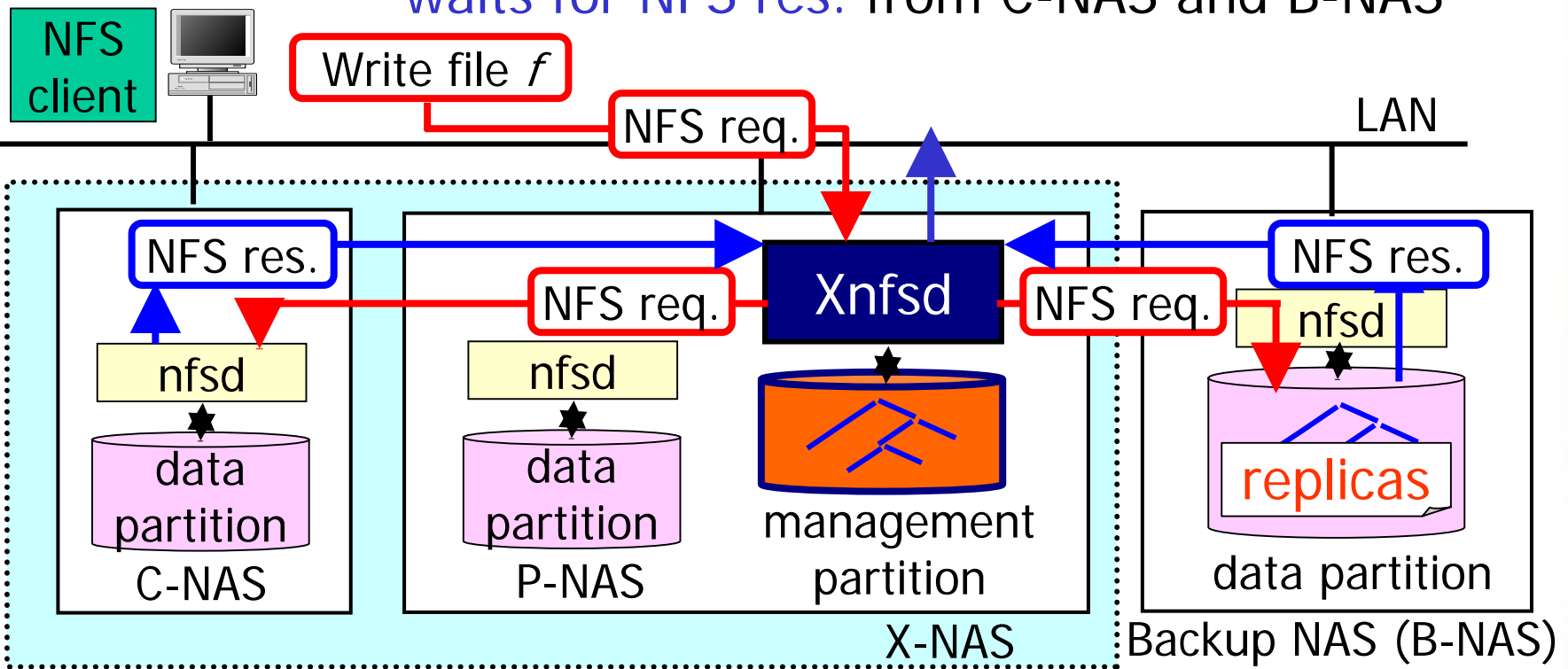
🙂 **Main point of this talk**



on-line backup

client

LAN

X-NAS

NAS: Network Attached Storage

:files    :NAS    :disks

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## Roles of Xnfsd

Virtualization: sends/receives NFS req. in place of nfsd

Replication: generates replicas for each NFS write req.
waits for NFS res. from C-NAS and B-NAS

NFS client

Write file *f*

NFS req.

LAN

NFS res.

NFS req.

Xnfsd

NFS req.

NFS res.

nfsd

nfsd

nfsd

data partition

data partition

management partition

replicas

C-NAS

P-NAS

data partition

X-NAS

Backup NAS (B-NAS)

*3*

# 3. Key Features with Low Overhead

## Issue

Waiting for all responses from X-NAS and B-NAS degrades total performance

## Solutions

Key features for low overhead:

- Replication file-handle cache
- Multi-threaded wrapper daemon
- Partial asynchronized backup method

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On-line backup function for X-NAS with low-overhead features improves reliability

## Advantages:

☺ Real-time:
   Generates replicas for each NFS operation

☺ Not proprietary:
   Uses NFS protocol for communication

☺ Easy to manage
   Does not add functions to clients' systems