



FAN - An Architecture for Data Management

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THE WORLD RUNS BETTER WITH F5



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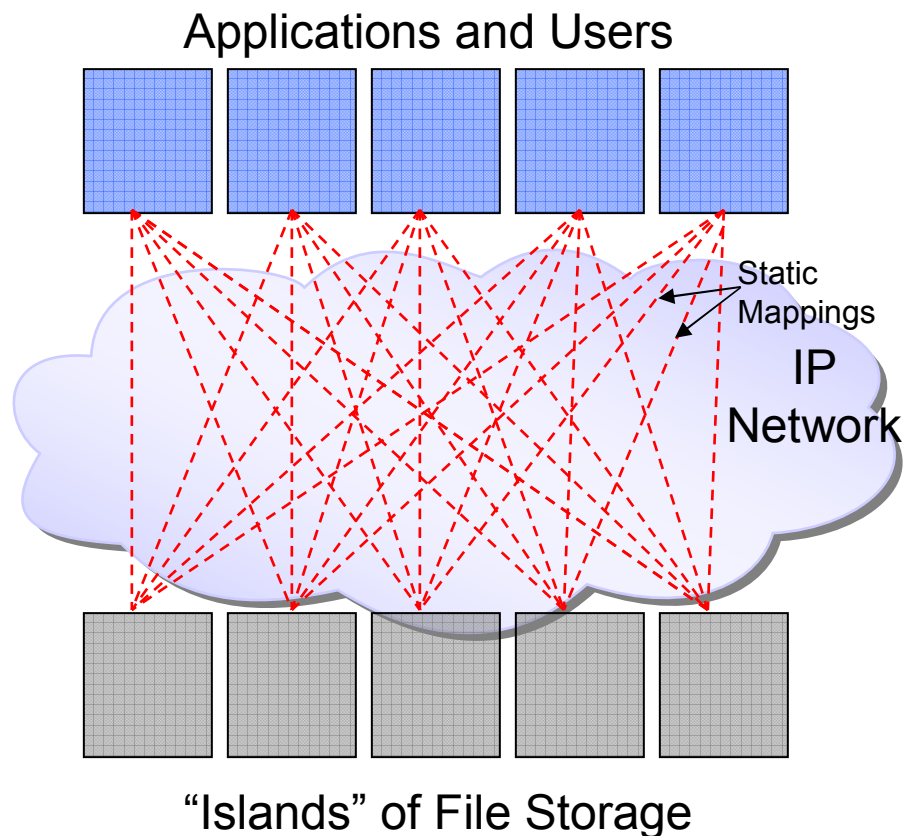
Agenda

- ❖ What is a FAN and why should you care?
 - ❖ Real-world Deployment Example
 - ❖ Fundamental approaches to building a FAN
 - ❖ Basic FAN Services and Approaches
 - ❖ Advanced FAN Services
 - ❖ FAN and Virtual Servers
 - ❖ Summary
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FAN = File Area Network

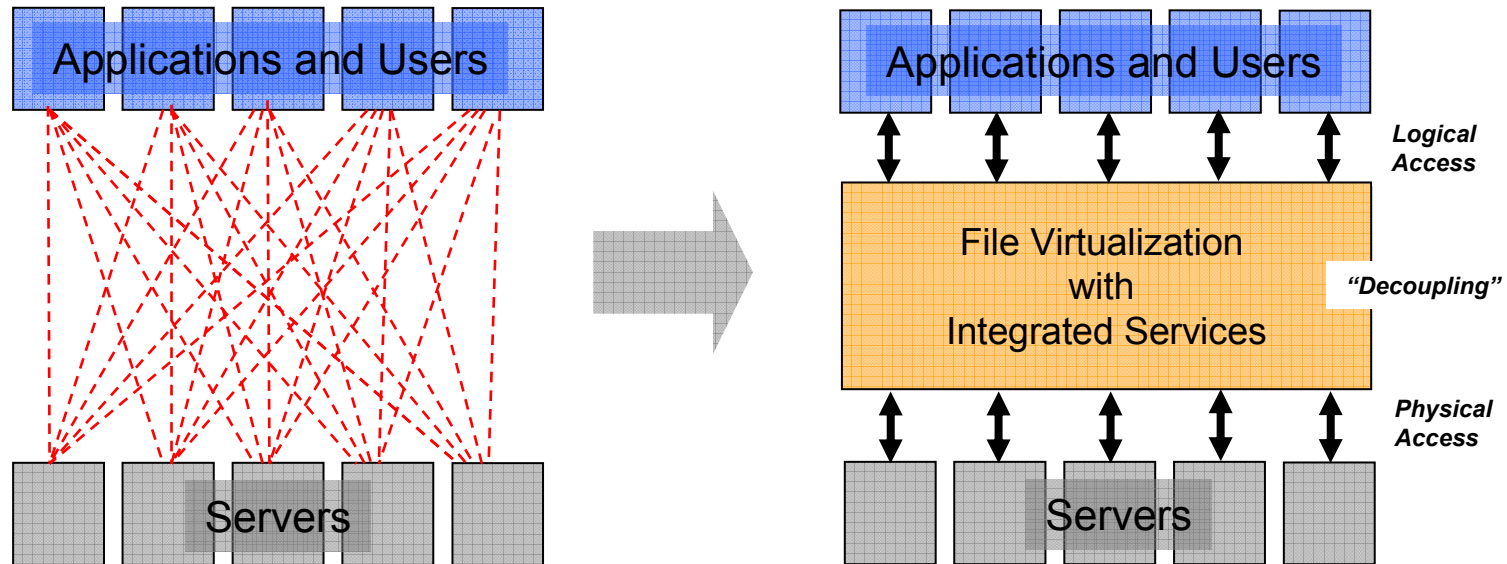
- ❖ A FAN enhances standard network and storage infrastructure with technology that provides centralized, heterogeneous, and enterprise-wide network file management and control.
- ❖ This technology includes a decoupling or virtualization layer that separates logical file access from physical file locations and a variety of value-added file services.

IT Challenges / Business Needs



- ❑ Files represent the largest portion of enterprise storage
- ❑ Highest growth rate
- ❑ Growing complexity
 - Mixed vendors, platforms, file systems
 - Increased application demands
 - Increased availability requirements
 - Enterprise-wide scope
 - This complexity is hampering the deployment of advanced file management services

FAN Targets These Challenges



❖ The Problem:

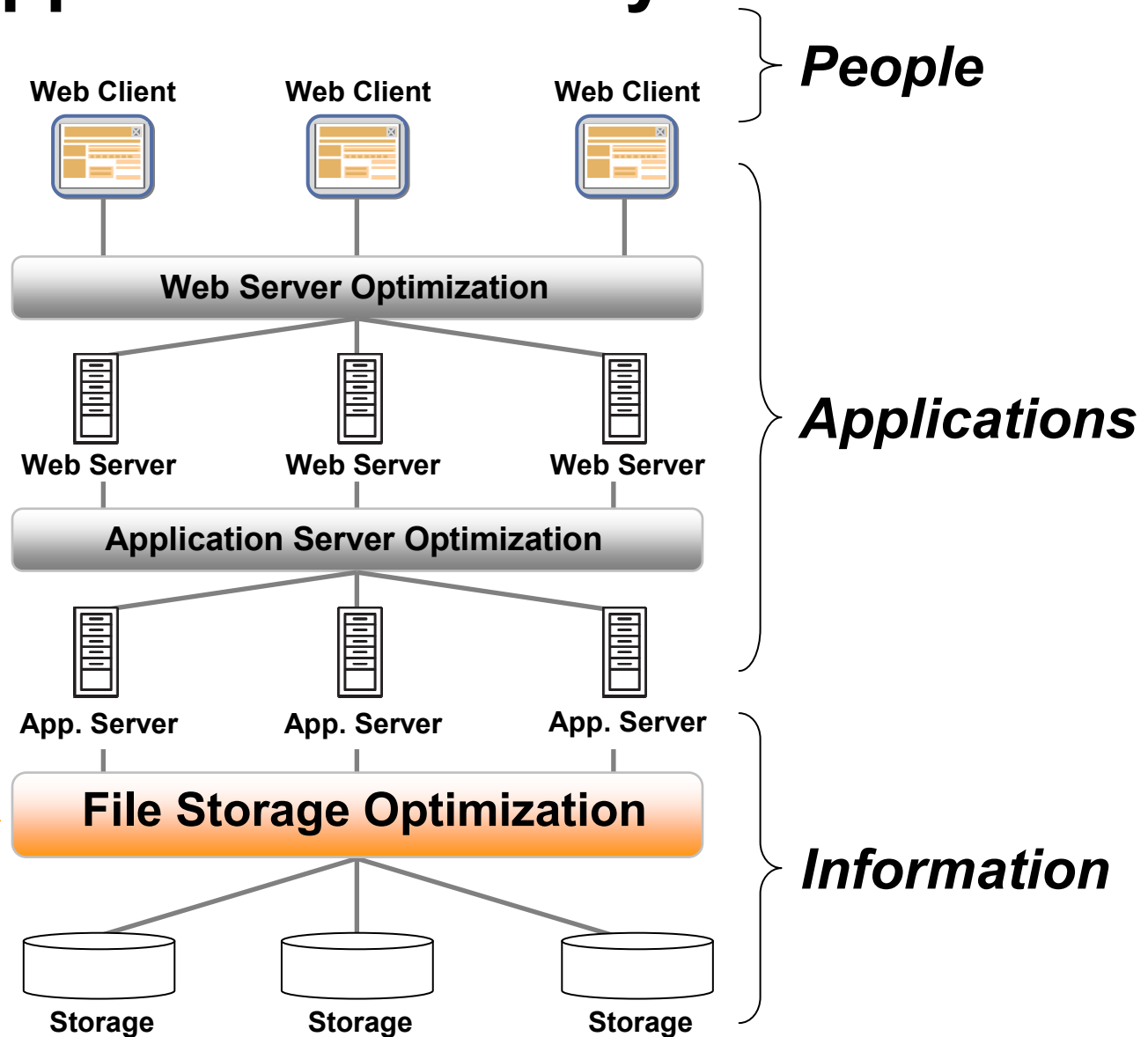
- The tight bindings between applications and storage are preventing the evolution of storage management (users and applications must be disrupted)

❖ The Solution:

- File Virtualization “decouples” the application and physical storage location
- Storage management can now be performed without any downtime or impact to applications
- This enables both basic and advanced storage management services

Part of an Application Delivery Network

FAN



Real-world File Virtualization Deployment

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Goals

- ❖ Advance File Servers Capabilities
 - Reduce data center resources (Space and Power)
 - Streamline management & support
 - Advanced backup and replication capabilities
 - Enable Tiering and Information Lifecycle Management
- ❖ Manage rapid storage growth
 - Current demands
 - Anticipated future growth
- ❖ Cost reduction
 - Better utilization of storage resources
 - Systems Administration resources

Defined Requirements

- ❖ Ability to move significant amounts of less critical data to a new storage tier quickly without disruption
 - ~50,000 users
- ❖ Heterogeneous product support
 - Not only for initial migration, but other future migrations as well
- ❖ Preservation of User Namespace
 - Past experience using manual migration techniques proved costly and yield high failure rates.
- ❖ Foundation for Information Lifecycle Management

Strategy

❖ Phase 1

- Problem Identification and scope

❖ Phase 2

- Communication of Problem Statement, Approach and Roadmap
- Selection and implementation of NAS storage
- Selection and implementation of virtualization tool

❖ Phase 3

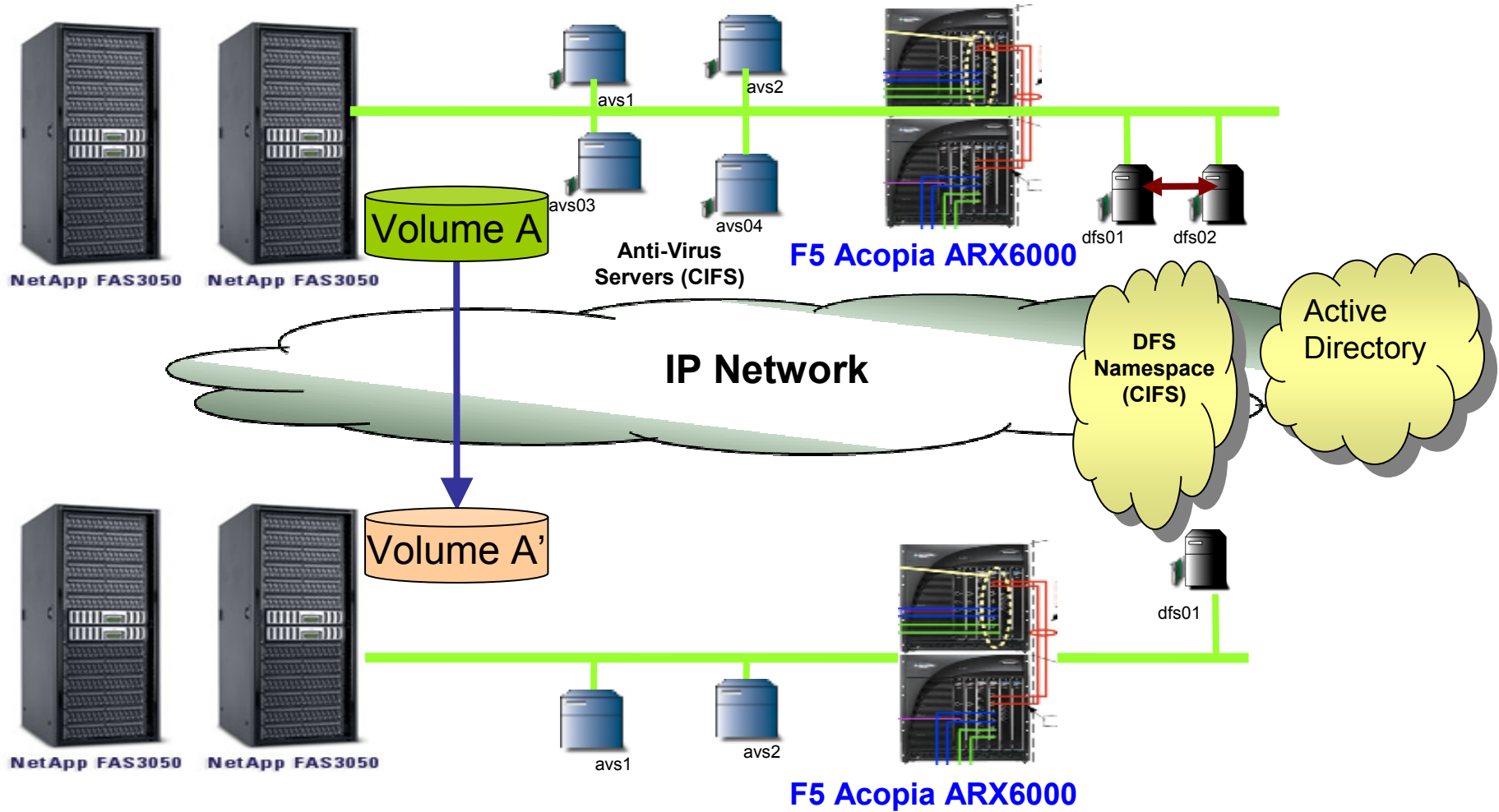
- Data migration
- Pause, monitor and review

❖ Phase 4

- ILM implementation

Solution

Global File Services Infrastructure (CIFS and NFS)



Benefits

- ❖ Feature-rich NAS offerings
 - Quota
 - Snap-shots
 - Snap-mirror
- ❖ Virtualization
 - Heterogeneous support
 - Global users name space
 - Transparent data migration
- ❖ Near Future
 - Multi-tier NAS plant
 - Policy based file migration (ILM)

Challenges

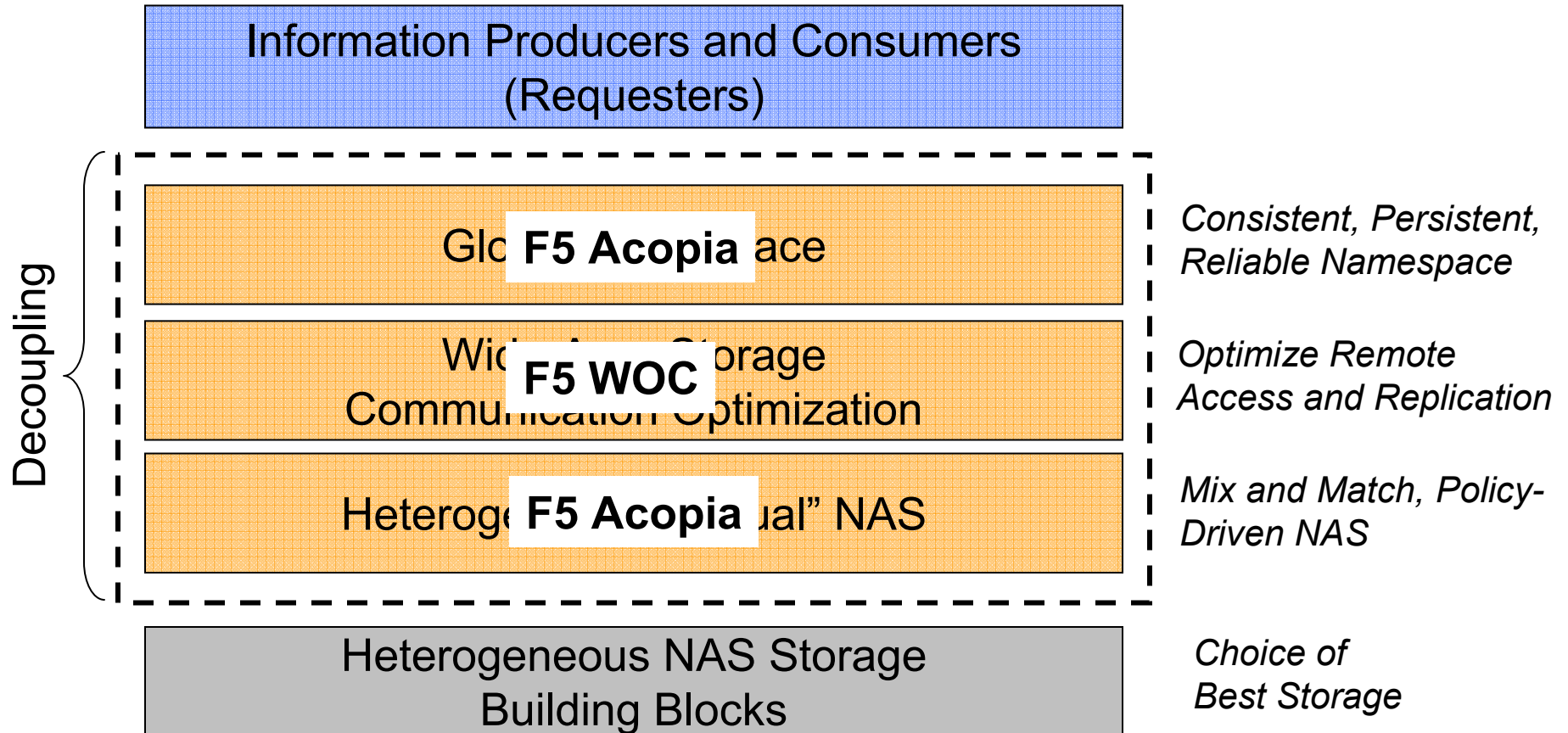
- ❖ Support Roles and Responsibilities
 - Who does what ?
- ❖ Unplanned storage requirements
- ❖ File restoration and tracking
- ❖ RTO Impact
- ❖ Lack of integrated management tools

Summary

- ❖ File virtualization is a key component in the global file services strategy
- ❖ We have focused our operations and engineering resources to implement and embrace the strategy
- ❖ Advice:
 - Know your Goals
 - Communicate your Plan and Scope
 - Monitor, Measure, and Adjust
 - Expect challenges and Manage Scope Creep
 - Communicate
 - Revise your strategy if required

Overview of FAN Basic Services and Approaches

A Simple FAN Model



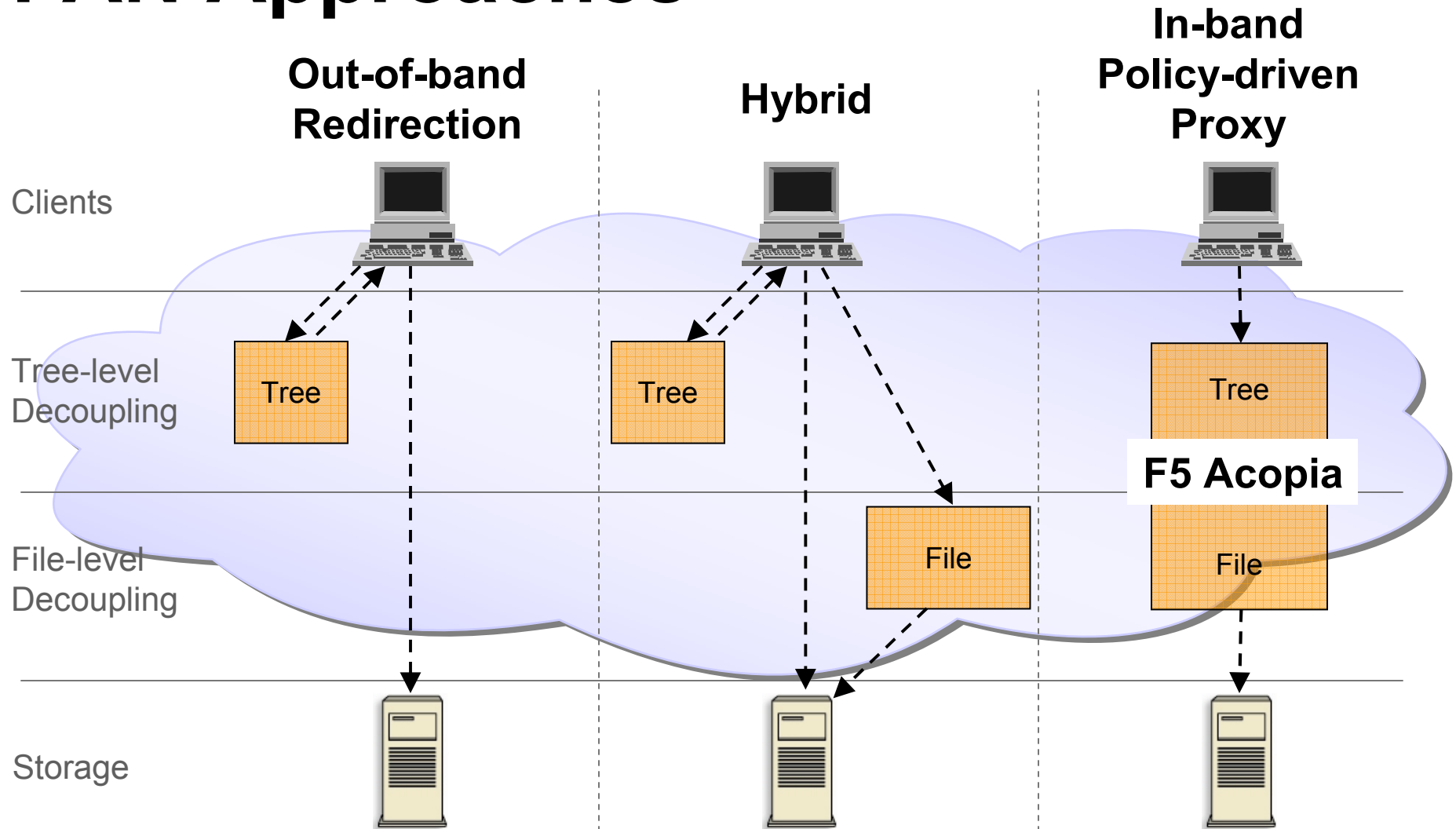
“Basic” FAN Services

- ❖ Migration
 - Move files from one server to another
 - ❖ Tiering / ILM
 - Place files via policy on the “best” storage
 - ❖ Load Balancing
 - Place files to better distribute capacity or load
 - ❖ Replication
 - Replicate files to support failover
-

Comparison of Approaches in Two Worlds

	Application Switching	File Virtualization
Simplest Implementation	Server Load Balancing (DNS)	Server-level Redirection (DFS)
	Server Load Balancing (L4)	Simple HSM ("stub"-based)
Most Capable Implementation	Full-proxy, Policy-driven, Request Router	Full-proxy, Policy-driven, File Router

FAN Approaches

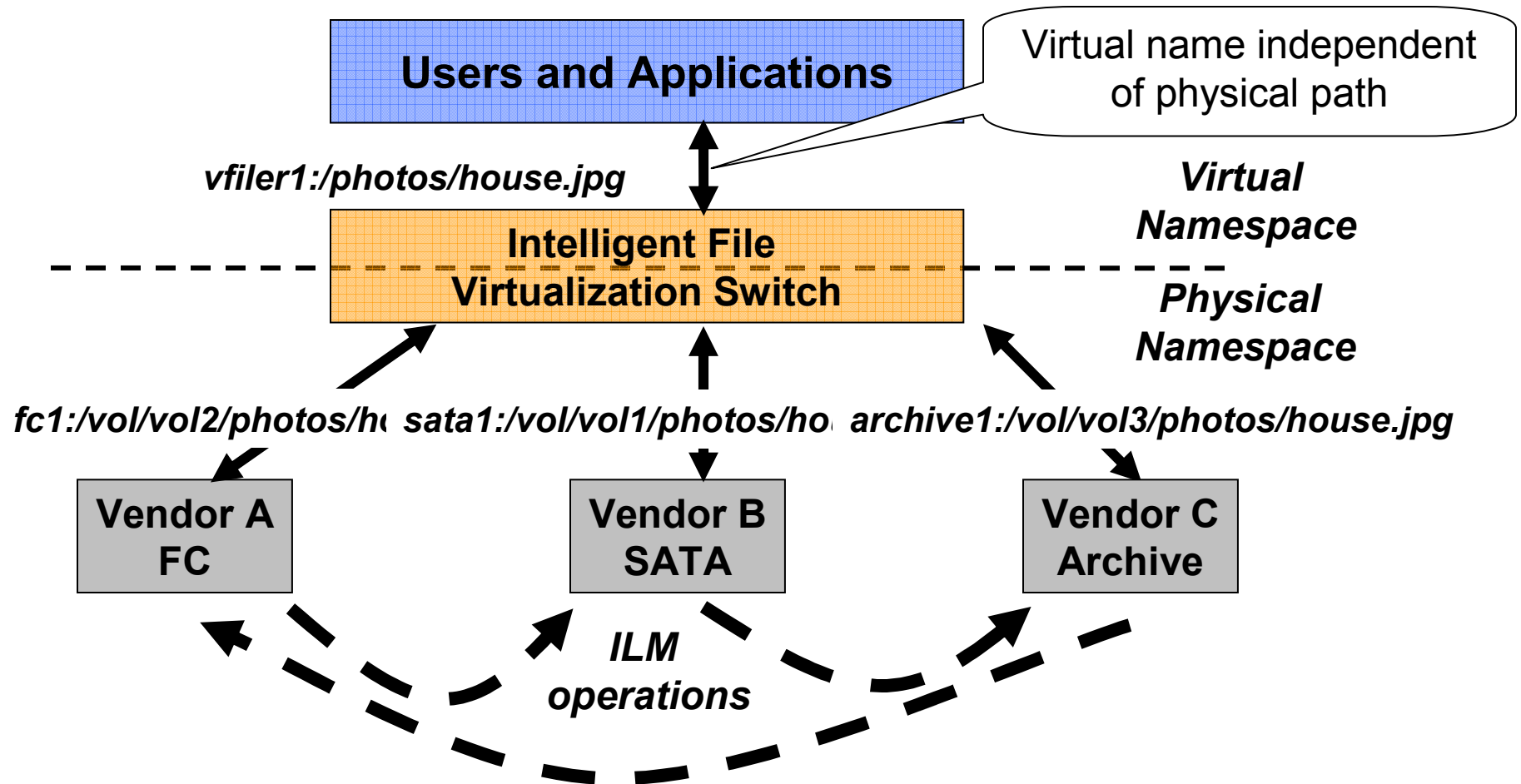


“On-Line” Service Capability

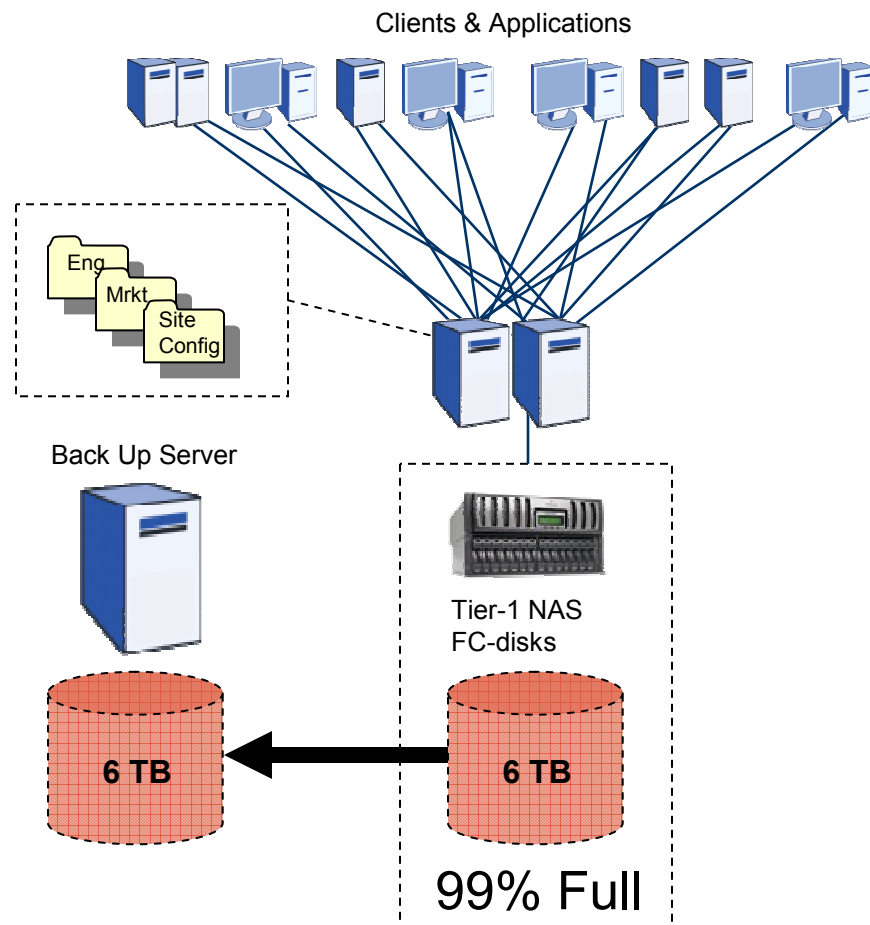
Approach	Migration	Tiering	Dynamic Load Balancing	Replication
Out-of-band Server-level Redirection	Yes (but disruptive)	No	No	Yes (async)
Hybrid	Yes (but disruptive)	Yes (but requires file server “stub” support)	No	Yes (async)
In-band File-level Policy-driven Proxy	Yes	Yes	Yes	Yes (async or sync)

Customer Case Studies

File-Level Decoupling



High Technology Company



IT Storage Challenges:

- ❑ Out of Capacity (99% Full)
- ❑ Help Desk – “Out of Space”
- ❑ Weekly backups take 3 days
- ❑ Growth /reorganization needs

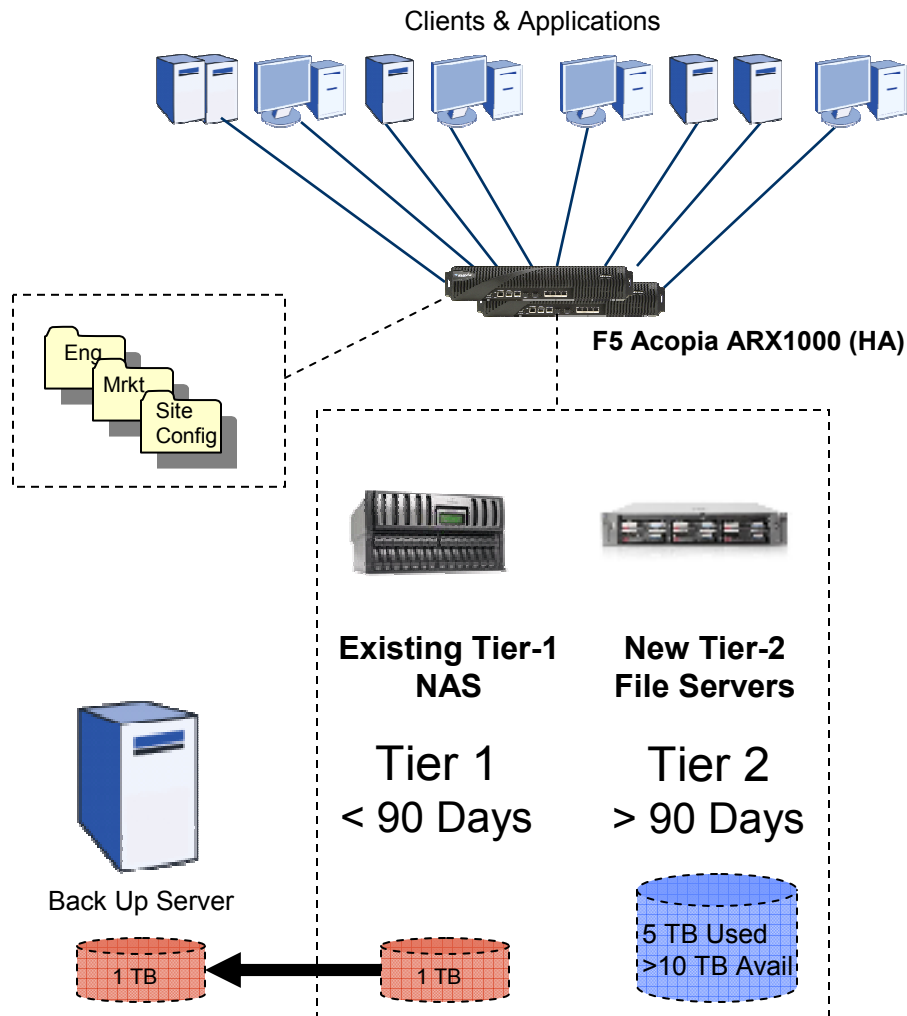
Traditional Plan/Solution:

- ❑ Buy Additional Tier 1 Capacity
- ❑ Downtime / Manual

Environment:

- ❑ Tier-1 NAS for CIFS
- ❑ 6 TB Data

High Technology Company



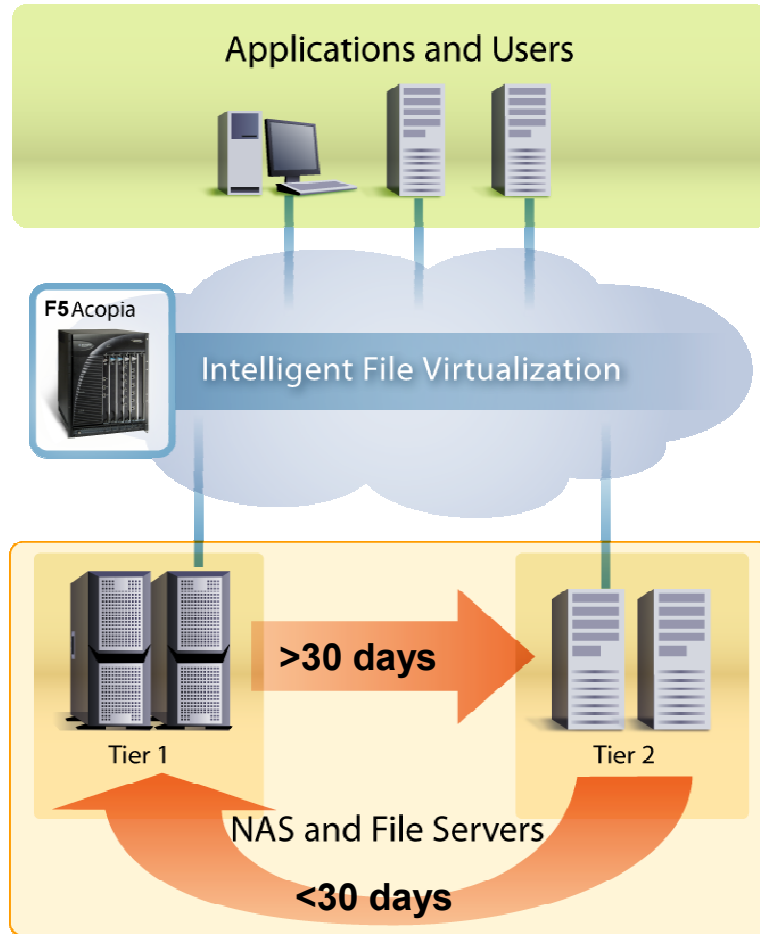
Solution:

- ❖ F5 Acopia ARX1000 cluster
- ❖ Tiered Storage Policy
 - If not changed for >90 Days then move to Tier 2
 - 80% of data moves to Tier 2
- ❖ Uses much lower cost storage for Tier 2
 - < 1/5 cost of current Tier 1

Benefits:

- ❖ Reduced capacity cost by 80%
- ❖ Reduced backup time by 30x
- ❖ Reduced backup costs by 70%
- ❖ No more “Out of Space” Calls
- ❖ 100% ROI over 4 months

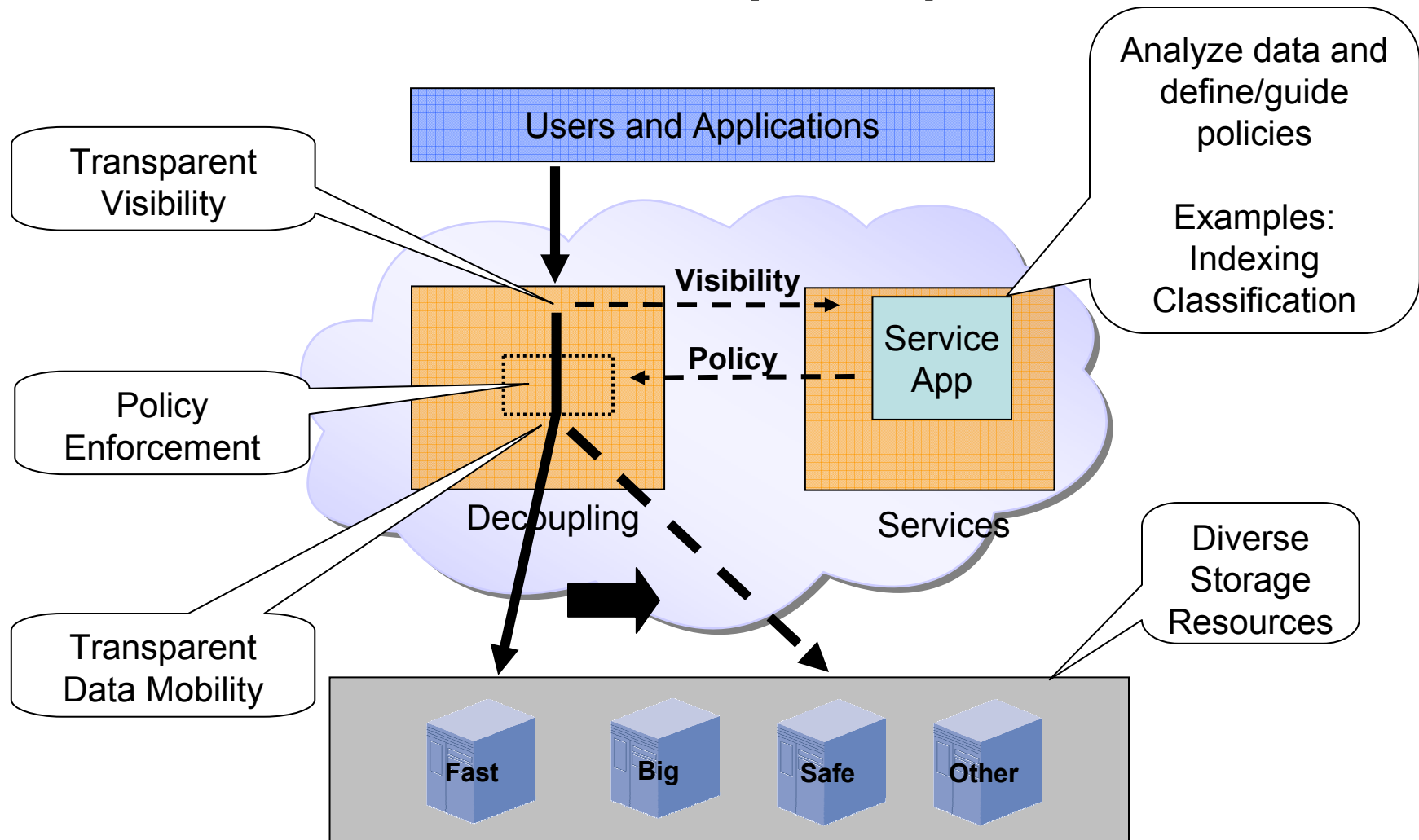
Publishing Company



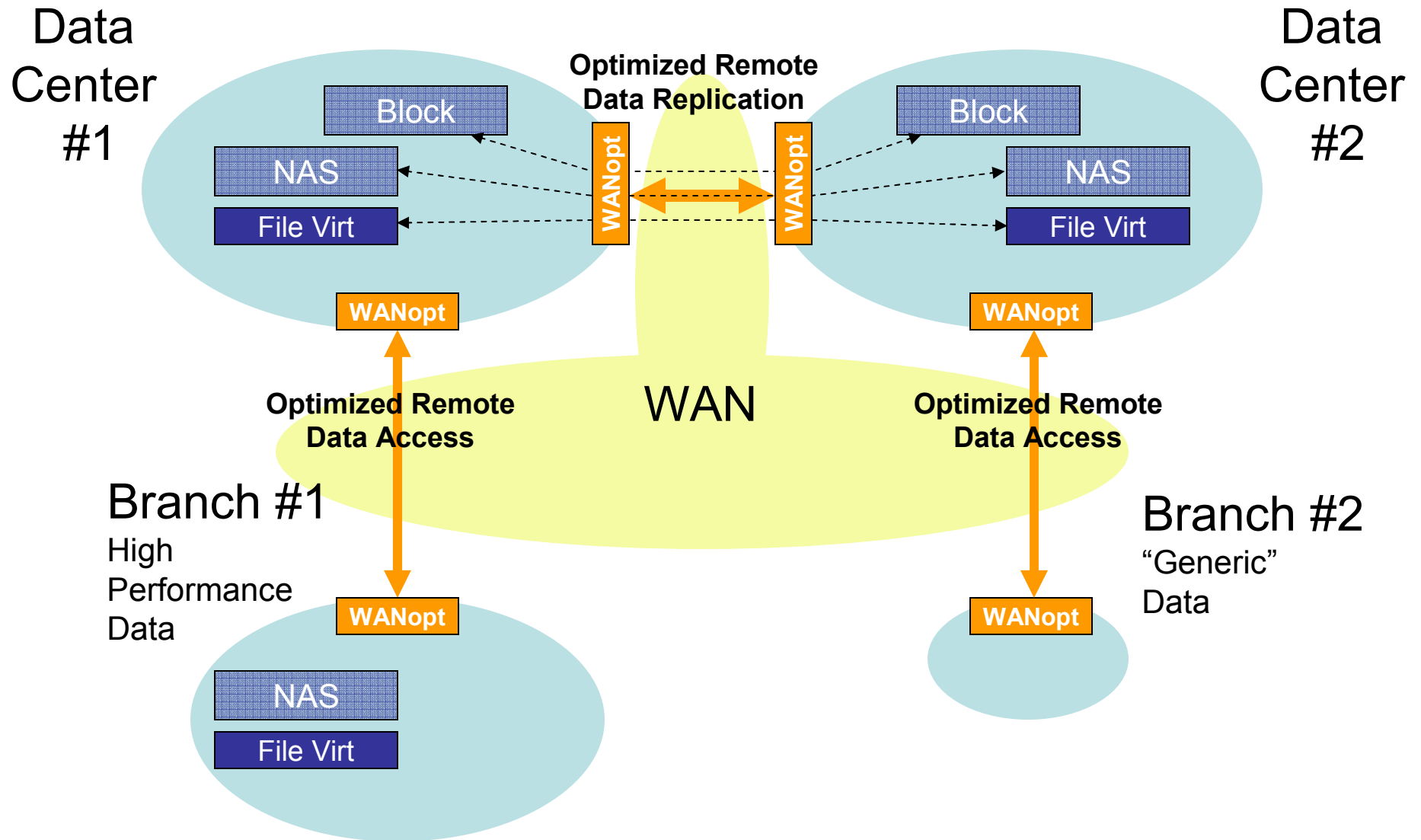
- ❑ Similar Challenge to Previous Example
 - Solution: File Virtualization-based Tiered Storage
- ❑ Disk Storage Cost Savings
 - 90% of data went to Tier 2
 - No more new Tier 1 purchases for a long time
 - New capacity is all Tier 2 (<1/2 cost)
- ❑ Tape Storage Cost Savings
 - With only 10% of the data left on Tier 1, tape consumption dropped by 10x
- ❑ Backup Time Reduction
 - With only 10% of data left on Tier 1, backup times dropped by >30x

“Advanced” FAN Services

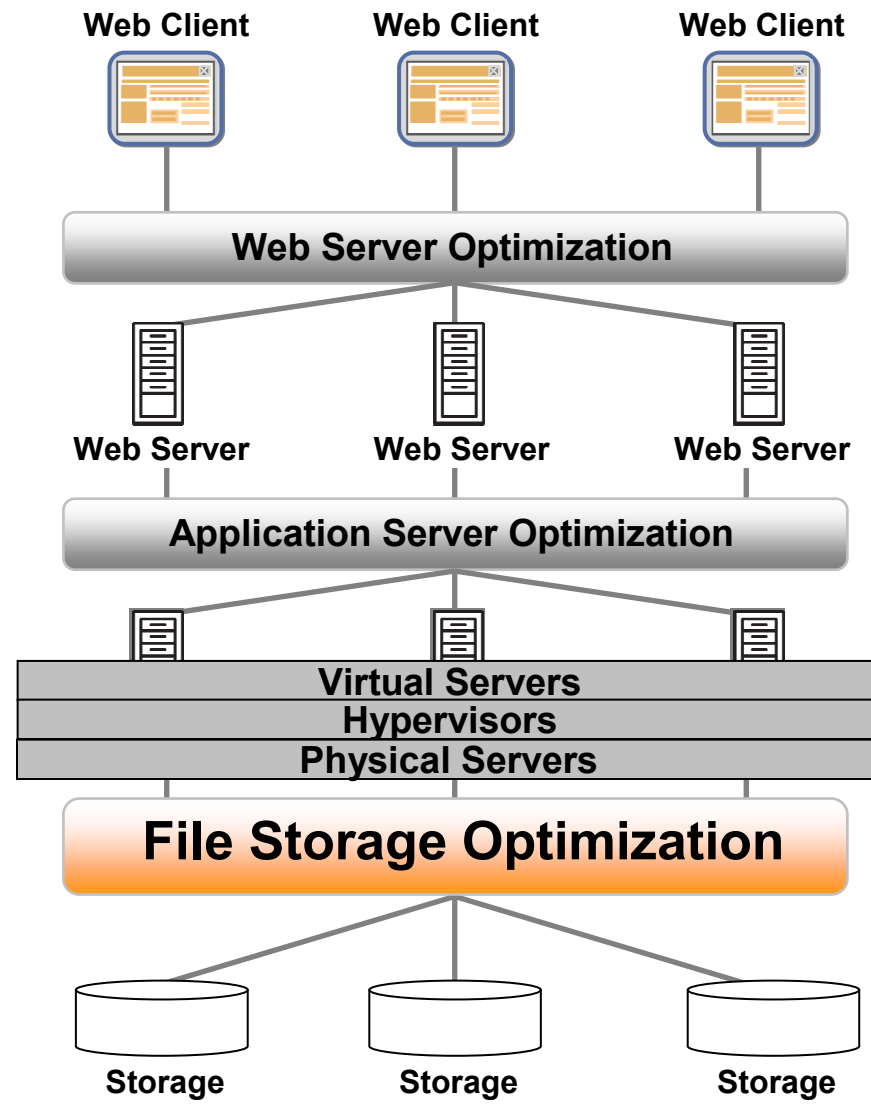
Advanced Services (LAN)



Advanced Services (WAN)



VMs Drive Need for File Storage Optimization



Why Optimized File Storage for VMs ?

- ❖ Provides a universal storage layer
 - Supports virtual boot storage, application block storage, application and user file storage
- ❖ Native shared access with flexible security
 - Supports full VM mobility across multiple physical servers
- ❖ Easiest to manage
 - Fastest to provision
 - Highest storage efficiency (“Thin provisioning” by default)
 - Uses standard Ethernet
 - Expands transparently without disruption to servers
- ❖ Wide vendor choice
 - Variety of performance (e.g. SSD), functionality, availability, and cost-focused options from many vendors
 - 10Gb Ethernet for high-performance environments

Summary

- ❖ FAN is a term used to describe a more formal approach to architecting a heterogeneous, enterprise-wide, service-oriented file storage infrastructure
 - FAN maps to the “data” layer of the ADN “stack”
 - Think “File Storage Optimization” (analog to “Application Server Optimization”)
- ❖ FAN implements a set of powerful foundation technologies that support both basic and advanced storage management services
- ❖ FAN could turn out to be as revolutionary for files (and down the road for objects...) as SAN was for block storage
 - Complements server virtualization



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