

# HPSS SAN3P

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# Topics

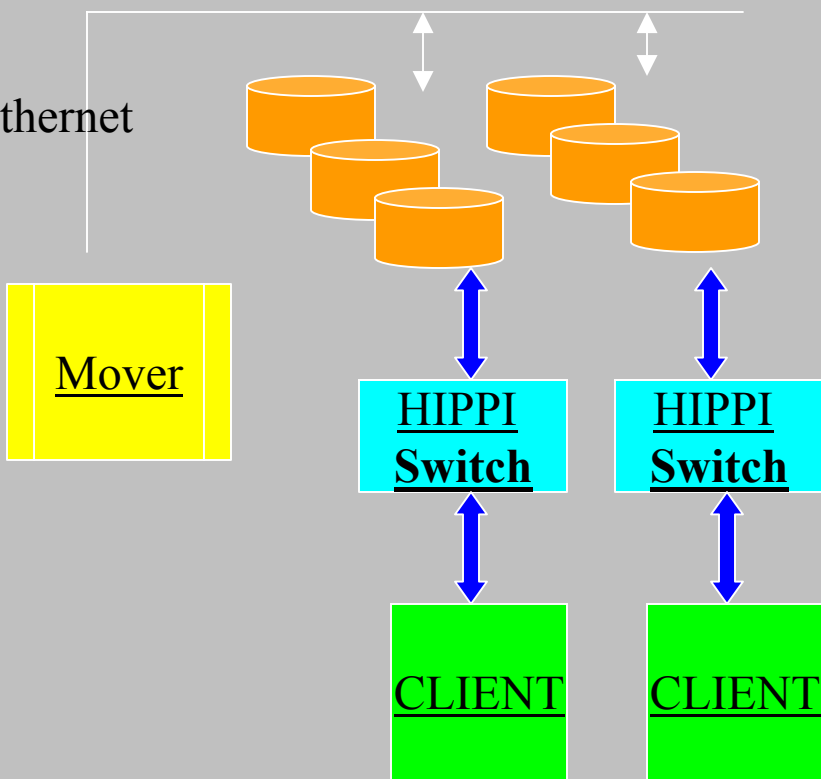
- Project History/Motivation
- Requirements
- Target Hardware Architecture
- Prototype
- Software Architecture
- IPI-3 vs SAN3P
- Security Issues
- SAN3P Limitations
- Current Status
- Futures

# Project History

- NSL – IPI-3
  - Separate Control and Data Paths
  - Security
    - Control ethernet
    - Hippi data xfer controlled by IPI device
    - No direct client access to devices

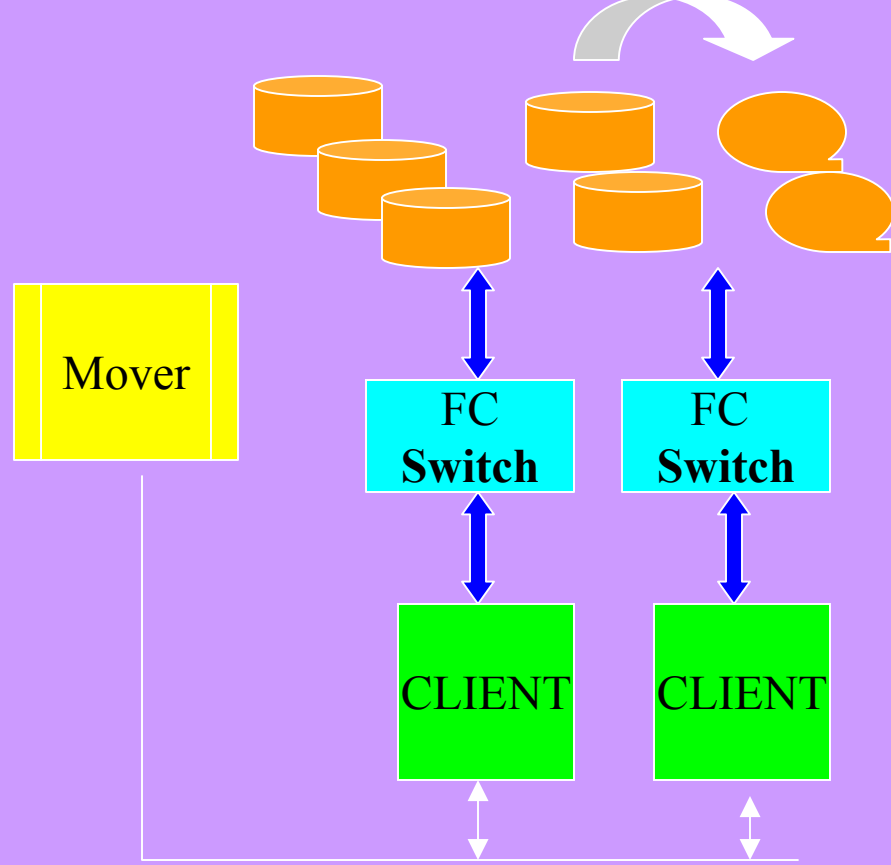
# Project History (2)

ethernet



IPI-3

scsi 3<sup>rd</sup> party copy



control n/w

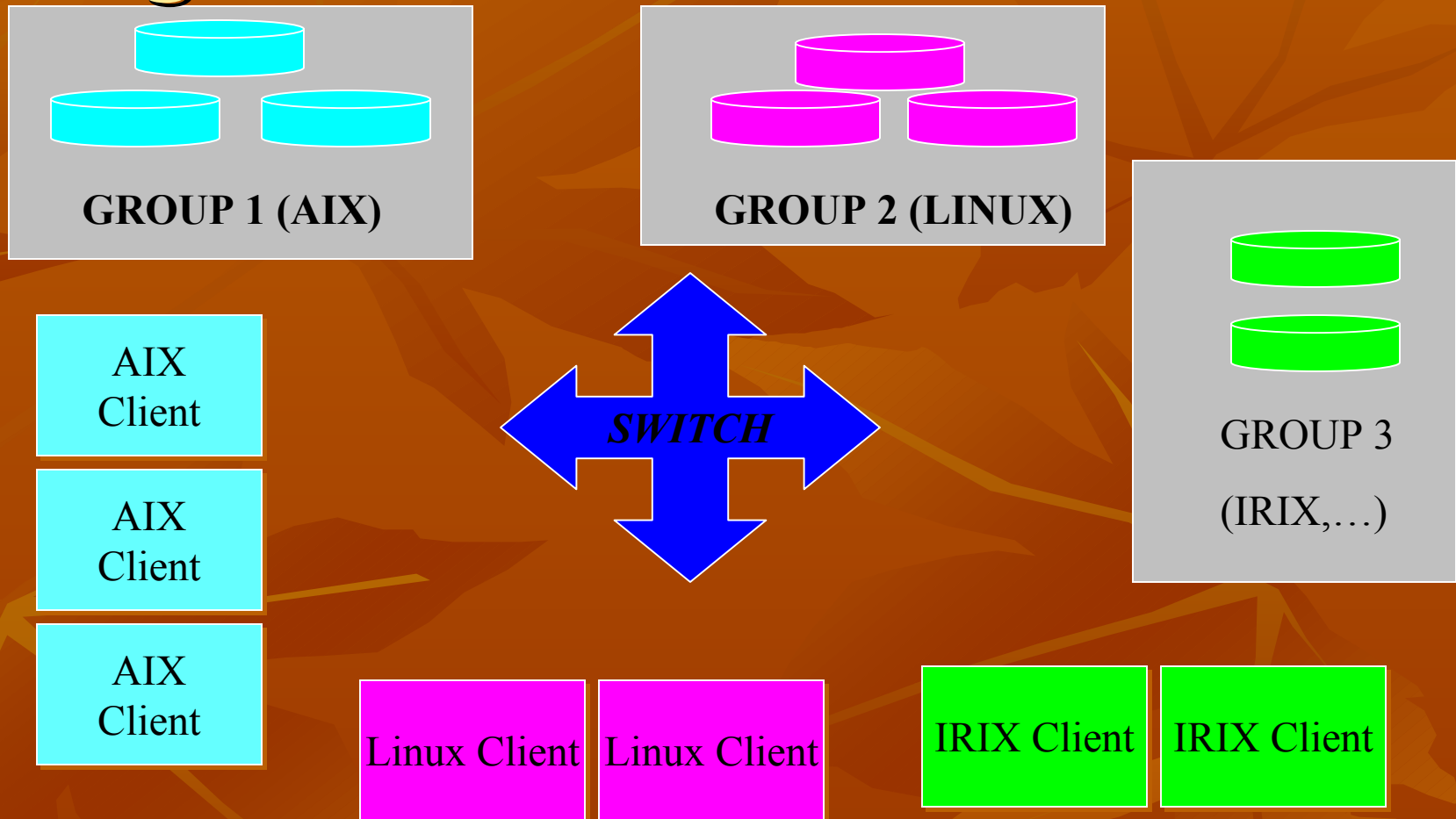
SAN

## SAN/IPI-3 - Similar Topologies

# Requirements

- 3<sup>rd</sup> party transfers to SAN-attached disks (future:tapes)
- No loss in transfer rates vs TCP/IP
- Multiple disparate groups of devices
- Mover selects transfer protocol
- Ability to easily disable for troubleshooting

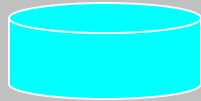
# Target Hardware Architecture



•Switch Zoning used to enforce grouping if desired

•HPSS Config file (movers)

# SAN3P Prototype at LLNL



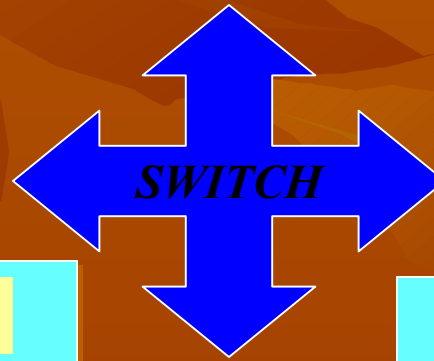
DDN FC Disk

Single Volume Group  
Shared via “-b” option  
when vg varied online



DDN FC Disk

HPSS 4.3  
(later, 4.5)



MOVER

CLIENT API Tests

HSI (IOD diag)

MOB2 (AIX)

MOVER

MOB3 (AIX)

# Software Architecture

- Mover
  - hpss\_san3p.conf configuration file
    - Device Groups
      - Device names
      - Hosts / networks allowed to access
      - Hosts / networks restricted from access
    - Choose SAN3P xfer type based on client host IP, client “san3p-capable” flags in IOD
    - Implement “conditional control” flag – choose pdata or mover protocol based on device/host/client flags
  - Add mover-to-mover logic to pass/use SAN Group ID

# Software Architecture (2)

- New IOD flags
  - SAN3P transfer type
  - Conditional-Control flag
- different Pdata/Mover Protocol message header delimiters
- new functions to read mover message and determine whether pdata/mover protocol

# Software Architecture (4)

- SSM changes:
  - add “san3p-capable” device config flags
  - add “SAN Group ID” field to device config
  - add mover managed object flag to enable/disable SAN3P transfers

# Software Architecture (3)

- HPSS Client API library
- upware compatible (API\_TRANSFER\_TYPE env. variable)
- new transfer type: “mover selects protocol”
  - sets “conditional control” flag in IOD for hpss\_Read, hpss\_Write
- SAN3P client library
  - Implement direct device I/O (read, write, read/modify/write)

# Software Architecture (2)

- New IOD and srcsink flags
- SAN3P address structure
  - Label checking requirement

# Software Architecture (3)

- HSI
  - simple change to add SAN3P transfer type to I/O modules
  - “san3p\_enabled” global hsirc option to
- PFTP
  - server side issues IOD – must know if client is SAN3P-capable (“feature” exchange)
  - removed “pipi3”, “pdata” commands (user should not have to choose protocol)
  - added support for san3p,tcp/ip,hooks for shared memory xfers in pdata.c

# IPI-3 vs SAN3P

- IPI-3 Master (AIX-> kernel process) that performed HIPPI I/O for client processes
- IPI Disk (Max Strat) controlled xfer, using Transfer ID, reading/writing from user buffer
- IPI-3 – private ethernet for mover-device communication
- SAN3P – mover passes device parameters to client
- SAN3P - Client must have read/write access to device

# Security Issues

- If host is compromised, entire SAN zone is jeopardized
- For mover-to-mover, sufficient to use SAN zoning
- Security issues for host-resident client apps (HSI,PFTP,...).
  - Set GID,Set UID for trusted Apps
- SAN Security Summit (~2 years ago) – no followon?
- Ongoing efforts (smart disk drives,...)

# SAN3P Limitations

- Homogeneous SAN groups (AIX LVM, Linux,...)
- Linux -> Page boundary restrictions for I/O buffers. SAN3P lib will have to be aware of limitations for specific architectures

# Current Status

- HPSS R6.1 (Linux only)
  - HSI- basic file xfers tested
  - PFTP Client – in progress
  - Client API – to be tested

# Future (?)

- Heterogeneous shared devices (?)
- SAN3P direct-to-tape client access (?)
- SAN Security standard(s) (?)
- Intelligent Disks
  - IPI-3 diagram here